Overview of Trends in Canadian Mineral

EXPLORATION

BY THE
CANADIAN
INTERGOVERNMENTAL
WORKING GROUP ON THE
MINERAL INDUSTRY

PREPARED FOR THE
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Preface

During the period 1988 to 1995, this report was titled *Mineral Exploration Expenditures and Flow-Through Share Funding*. However, in June 1996, the joint federal/provincial Intergovernmental Working Group on the Mineral Industry (IGWG) decided on a new title: *Overview of Trends in Canadian Mineral Exploration*.

The report describes current mineral exploration trends in Canada and places new emphasis on the intensive search for diamonds, Canada's ranking as a world exploration target, and the foreign exploration activities of Canadian companies.

The data contained in this report (current as of April 1996) and the views expressed by the various authors have been assembled and agreed upon by IGWG. The Minerals and Metals Sector of Natural Resources Canada (NRCan) was responsible for compiling the report.

Please note that, throughout the report, mineral exploration refers to exploration for metallic minerals, nonmetallic minerals, coal and uranium. It does not refer to exploration for oil sands, tar sands, or oil and gas.

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Executive Summary

The federal-provincial survey of mining and exploration companies indicates that Canadian exploration activity has recovered to healthy levels. Exploration expenditures have been growing steadily since 1992 when spending was at a low of $385 million. Since then, expenditures increased to $477 million in 1993, $628 million in 1994, and $764 million (preliminary estimate) in 1995. Company spending intentions reveal that $945 million could be spent on exploration in Canada in 1996.

In 1995, the Northwest Territories, Québec and Ontario were Canada's most actively explored jurisdictions. Spending increased in most provinces/territories, but expenditures in Newfoundland and the Northwest Territories increased the most. In 1996, the Northwest Territories, Québec and Ontario should again account for most of the total exploration expenditures in Canada. Also in 1996, Newfoundland, British Columbia and Québec are expected to account for most of the predicted $182 million net increase in exploration spending.

Spending by junior exploration companies rose by 33% to $261 million in 1995, and is expected to increase by a further 46%, to $380 million, in 1996. Although not predicted to increase as strongly, spending by senior exploration companies is still expected to climb from $503 million in 1995 to $565 million in 1996.

A significant amount of the increasing junior activity has been financed by flow-through shares with an estimated $123 million raised in 1995. Some $160 million-$180 million may be raised in 1996. In its 1996 Budget, the federal government announced the extension of the "look-back" period for flow-through-share-financed exploration from 60 to 365 days. This measure should improve the efficiency of flow-through-share-financed exploration programs.

Several trends have emerged in 1995 and 1996. The interest generated by the Voisey's Bay nickel-copper-cobalt deposit in Labrador remains strong, attracting a large contingent of primarily junior companies. Base-metal and gold prices continue to be relatively strong, contributing to the exploration recovery throughout the country.

Moreover, exploration for diamonds is widespread and continues unabated with advanced projects supporting the growth in expenditures. From 1993 to 1996, more than $560 million will have been spent on diamond exploration in Canada. Out of the numerous diamond properties across Canada in late 1995, one (Lac de Gras) is expected to begin production in 1998 and three others also appear to have high potential for production.

Globally, Canada remains one of the top destinations for exploration capital. In 1996, only Australia will challenge Canada for first place. Canadian companies continue to increase their activities abroad with more than 2750 mineral properties in 99 countries around the world. Canadian companies are also assuming an increasing amount of geological and country exposure abroad. They have now captured a substantial share of foreign mineral exploration markets, especially in Latin America. However, globalization is not only taking place in developing countries. Many foreign companies are continuing to diversify their mineral property portfolios into developed countries, including Canada.

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1. Canadian Mineral Exploration Expenditures

1.1 INTRODUCTION

This section highlights the 1995 preliminary estimates and the 1996 company spending intentions for Canada, as obtained through the federal-provincial survey of mining and exploration companies. This survey is described in **Appendix A**. A statistical model, designed by NRCan's Minerals and Metals Sector, also provides predictions on the amount of junior and senior mineral exploration that will occur in 1996.

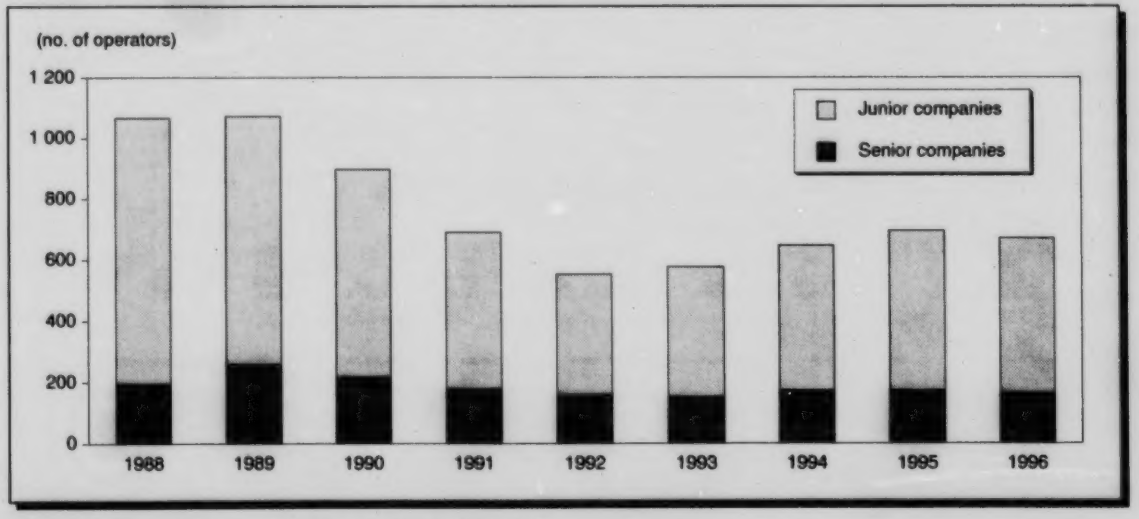
1.2 1995 EXPLORATION EXPENDITURES

1.2.1 Statistical Summary

In 1995, about 695 companies (**Figure 1**) spent $763.5 million (**Figure 2**) on mineral exploration in Canada. That amount represented an increase of 22% over 1994 expenditures. As well, the number of active companies increased by 7%. A total of 130 companies (compared to 108 in 1994) each spent $1 million or more on exploration in 1995; these companies' expenditures accounted for 86% of total expenditures for that year.

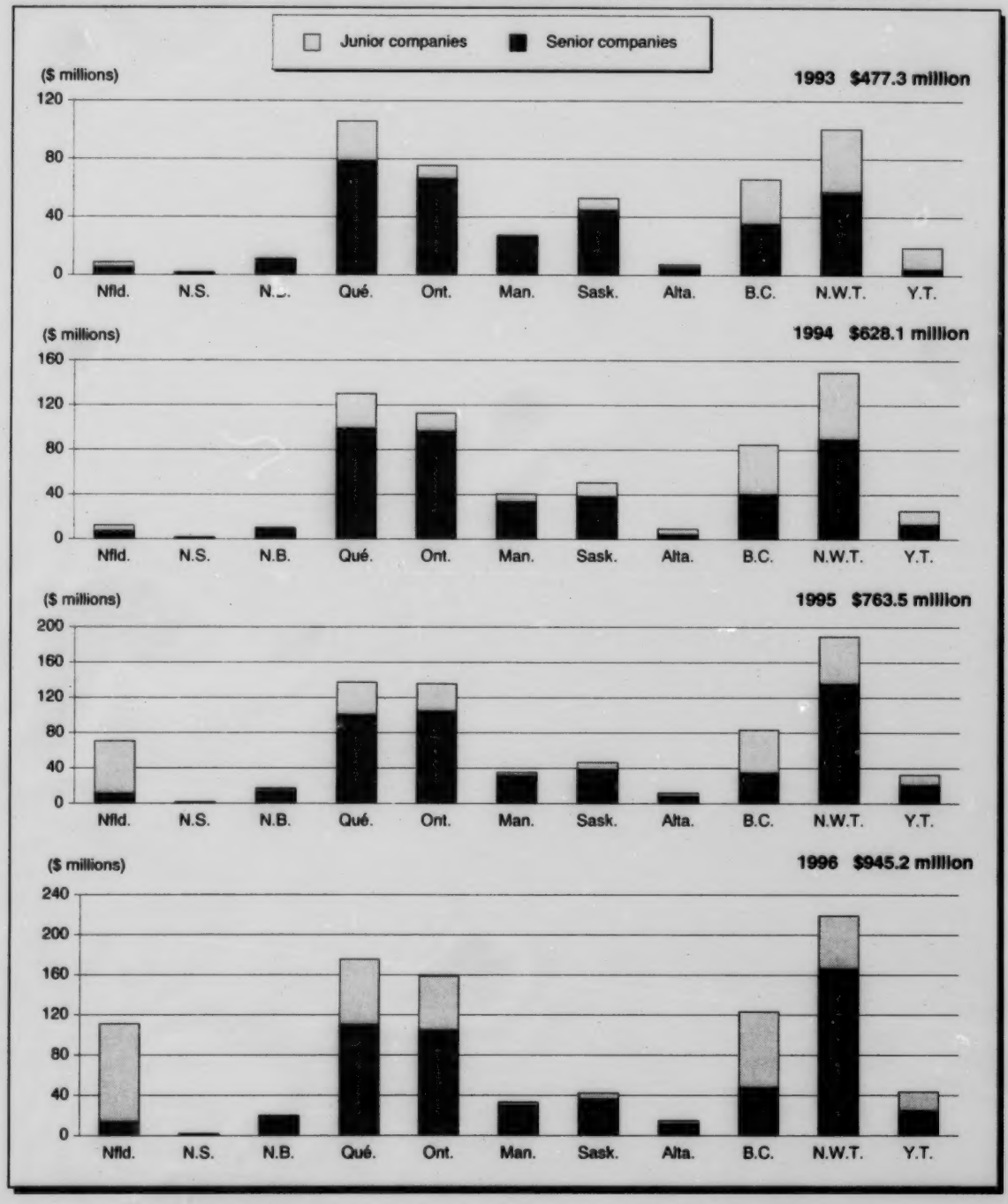
Spending increases were recorded in most provinces and territories for an overall total of $145.8 million. Major increases were seen for Newfoundland (40% of the $145.8 million), the Northwest Territories (27%) and the Yukon (16%). Only Manitoba, Saskatchewan and British Columbia experienced decreases in exploration activity (a total decrease of $10.4 million).

Figure 1
Number of Project Operators Active in Exploration, 1988-96



Source: Federal-provincial survey of mining and exploration companies.
Notes: Data exclude prospectors. 1995 data are preliminary; 1996 data are company spending intentions.

Figure 2
Exploration Expenditures by Junior and Senior Companies by Province and Territory, 1993-96



Sources: Natural Resources Canada and Statistics Canada, through the federal-provincial survey of mining and exploration companies.
Notes: 1995 data are preliminary estimates; 1996 data are company spending intentions. Overhead expenditures are included.

In decreasing order of amounts spent on exploration, the Northwest Territories, Québec, Ontario and British Columbia accounted for 72% of all exploration expenditures in Canada. Newfoundland improved its national ranking, from seventh in 1994 to fifth in 1995, with 9% of total Canadian exploration expenditures.

In 1995, expenditures for general (off-property) exploration activity increased by 24% over 1994. Overall, 90% of all exploration expenditures ($686.6 million) in 1995 were for general exploration activity. The Northwest Territories ranked first in general exploration activity with 27% of the total, followed by Ontario and Québec with about 16% each. Mine-site exploration expenditures increased by 7% to $76.9 million. Mine-site exploration expenditures contributed, at most, 5% of the respective exploration totals of Newfoundland, Nova Scotia, Saskatchewan, British Columbia, the Yukon, and the Northwest Territories; up to 10% for New Brunswick, Québec and Ontario; and more than 20% for Saskatchewan and Alberta.

1.2.2 Spending by Junior and Senior Firms

A total of 174 senior project operators (non-junior companies) accounted for 66% ($503 million) of all exploration expenditures in 1995 (**Figures 1 and 2**). Their share of total exploration expenditures represented an increase of 16% over 1994 when the same number of senior project operators spent $432 million.

About 68% of the expenditures reported by senior firms occurred in the Northwest Territories, Ontario and Québec (in decreasing order). Senior firms increased their expenditures in 1995 in most provinces and territories except Nova Scotia, Manitoba and British Columbia. Increases exceeded 50% in Newfoundland, New Brunswick, Alberta and both territories.

Senior companies are the main contributors to exploration expenditures in all provinces and territories except Newfoundland, Nova Scotia and British Columbia. The share of senior expenditures exceeded 80% in New Brunswick, Manitoba and Saskatchewan.

The number of junior project operators increased by 10% to 521 in 1995, compared to 473 in 1994. Since only aggregated prospectors' expenditures are provided by provincial survey partners, prospectors are not counted in this total. In addition, some provinces do not survey prospectors because of resource and time constraints. Prospectors accounted for approximately 1% of total Canadian exploration expenditures in 1994; the percentage is estimated to be much lower in 1995.

Altogether, junior companies and prospectors spent $261 million in 1995. That amount represents a 33% increase over 1994. Junior exploration grew by a factor of 10 in Newfoundland, by a factor of 3 in New Brunswick, and almost doubled in Ontario. It increased slightly in Québec and British Columbia, and decreased in all other provinces and territories. Overall, Newfoundland, the Northwest Territories and British Columbia accounted for 62% of all junior expenditures in 1995.

1.2.3 Main Exploration Targets

Appendix B describes the two main exploration projects or groups of projects for each province and territory in 1995. Expenditures on the projects listed in Appendix B totalled $253 million and represented 32% of all exploration expenditures for that year.

In fact, only 20 companies accounted for $277 million, or 36% of all expenditures. Close to 80% of these expenditures were made by seniors. Emphasis was placed on diamond exploration in the Northwest Territories and on base-metal exploration in Labrador. The main projects account for more than half of the total provincial/territorial exploration expenditures for the Northwest Territories, Alberta and New Brunswick.

1.3 1996 EXPLORATION EXPENDITURES – AN OUTLOOK

1.3.1 Statistical Summary

In 1996, 671 active companies intend to spend $945 million on exploration in Canada. Despite a 3% reduction in the number of active companies, expenditures should increase by 24% over 1995. A total of 158 companies (130 in 1995) intend to spend $1 million or more. These 158 companies should spend a total of $824 million, or 87% of total intended expenditures for 1996.

Most of the $187 million increase in exploration spending that is foreseen in 1996 in Canada should occur in Newfoundland, British Columbia and Québec. Each of these three provinces should capture about 20% of the total increase, while the Northwest Territories should account for 16% of it. Exploration expenditures are forecast to increase in all provinces and territories except Manitoba and Saskatchewan, which should experience small decreases of 6% and 9%, respectively. The increases are expected to vary between 15% (New Brunswick) and 57% (Newfoundland). As in 1995, almost three quarters of the expenditures will be reported, in decreasing order, by the Northwest Territories, Québec, Ontario and British Columbia. Newfoundland will follow closely with $111 million (12% of all expenditures).

Spending intentions (**Table 11**, Section 6.2) indicate that expenditures on general exploration should increase by 26% from $687 million in 1995 to $866 million in 1996. This type of expenditure should account for 92% of total spending. Mine-site expenditures are expected to increase by only 3%.

1.3.2 Spending by Junior and Senior Firms

A total of 166 senior companies intend to spend $565 million, representing 60% of total 1996 exploration expenditures and a 12% increase in senior company expenditures over 1995.

Most of the expenditures by senior firms should occur in the Northwest Territories, Ontario and Québec. As in 1995, senior company expenditures are expected to exceed 80% of the total exploration expenditures in New Brunswick, Manitoba and Saskatchewan. Expenditures by the seniors are forecast to increase in most regions, especially in British Columbia where they should increase by almost 40%.

The survey shows that the number of junior company project operators will decrease by 3% in 1996. However, this reduced number of companies is expected to contribute a much higher level of expenditures than in 1995. Juniors should spend $380 million in 1996, a 46% increase from the $261 million spent in 1995. The amount spent by juniors should increase by more than 50% in all provinces and territories except New Brunswick, Saskatchewan, Alberta and the Northwest Territories.

In 1996, more junior companies (89 compared to 63 in 1995) intend to spend $1 million or more on exploration. They are expected to account for 30% ($282 million) of all exploration expenditures compared to 22% ($171 million) in 1995. About the same number of senior companies (174) are expected to spend 57% ($542 million) of the total, compared to 63% ($480 million) in 1995.

1.3.3 Main Exploration Targets

Appendix B describes two main exploration projects or groups of projects by province/territory in 1996. These projects total $316 million, or 33% of all intended exploration expenditures. Overall, 22 companies reported $332 million, or 35% of all intended expenditures in Canada for 1996. About 74% of those expenditures will be incurred by senior companies. As in 1995, the main exploration targets are diamond deposits in Canada's North and base-metal deposits in Labrador. The selected projects represent in excess of 50% of the total regional exploration for the Northwest Territories, Newfoundland, New Brunswick and Manitoba.

1.3.4 Outlook for Exploration Based on Statistical Estimation

1.3.4.1 Introduction

In this section, an alternate attempt is made to predict the level of exploration for 1996 using standard statistical estimation techniques. Exploration spending by both senior and junior mining companies was estimated by linking it to factors for which historical data are available.

1.3.4.2 Methodology

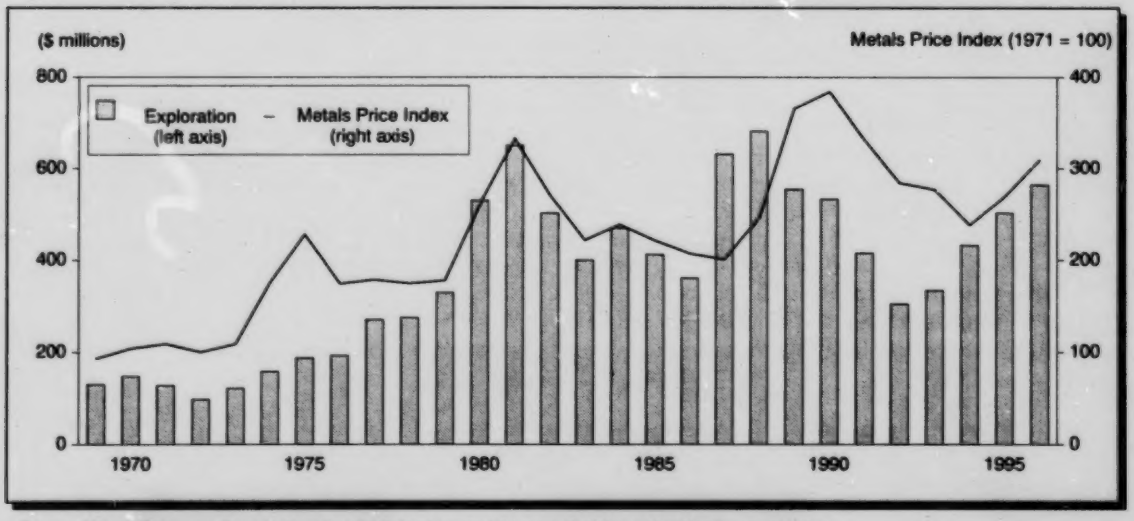
An analysis of historical data indicates that the level of expenditures on mineral exploration in a given year can be linked to the previous year's metal prices, particularly in the case of senior companies. This may be because companies view exploration as an investment, with expected returns being dependent on expected revenues from the subsequent mining of discovered deposits. Expected future revenues would obviously depend on future commodity prices, and expectations of future prices would likely be influenced by current prices. As well, prices influence the level of a company's revenues and the amount of internal funds available for spending on mineral exploration.

Changes in exploration spending are likely to lag changes in metal prices because exploration activity in a particular year is the result of a budgeting process that takes place in the preceding year. Budget allocations in a given year are therefore likely to reflect the metal prices and company profits of the preceding year.

Figure 3 shows the relationship between historical exploration expenditures by senior companies and NRCan's yearly metals price index, lagged one year. This index is a composite of the prices of six metals: gold, silver, copper, zinc, lead and nickel.

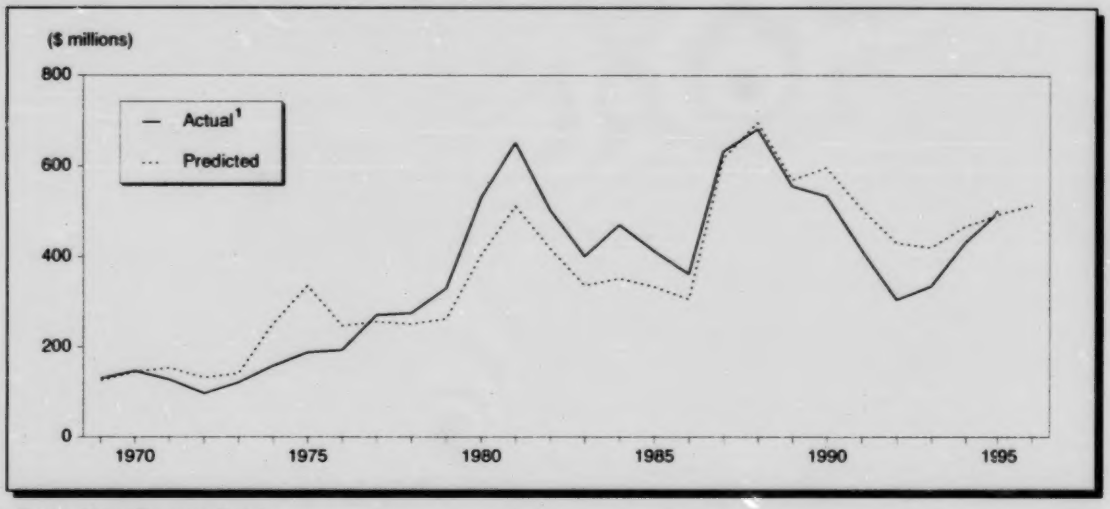
In addition to metal prices, the expectations and excitement caused by such factors as the diamond discoveries in the Northwest Territories and the large nickel-copper-cobalt discovery at Voisey's Bay obviously affect the level of exploration spending, especially for junior mining companies. However, it is difficult to find data that could be used to capture the influence of these expectations' factors in a statistical modelling exercise. In the case of junior mining companies, a variable representing yearly claim-staking activity was used along with the metals price index. For this variable, as with the metals price index, a lagged form was found to provide the best fit.

Figure 3
Senior Exploration Expenditures and Metals Price Index Lagged One Year, 1969-96



Source: Natural Resources Canada, based on the federal-provincial survey of mining and exploration companies.
Note: 1995 exploration data are preliminary; 1996 data are company spending intentions.

Figure 4
Actual and Predicted Senior Exploration Expenditures, 1969-96



Source: Natural Resources Canada.
[1] For 1995, preliminary expenditures are shown because actual expenditures were not available.

1.3.4.3 Results

The statistical equation, using data for the years 1969 to 1995, predicts senior exploration expenditures in 1996 of about $515 million (**Figure 4**). For junior companies, the estimated equation would predict exploration expenditures for 1996 of about $200 million. This would imply a total of about $715 million.

However, as noted above and reported on in greater detail in Section 4, diamond exploration on a large scale (forecast at $177 million for 1996) is relatively new in Canada with 1993 representing the first major increase over previous years. The diamond rush that has ensued since 1993, together with the excitement generated by the Voisey's Bay discovery, likely means that the estimate of $715 million for 1996 understates the total value of exploration that will actually occur.

1.4 FLOW-THROUGH SHARE FUNDING

In 1993, flow-through share (FTS) financing stood at about $40 million, down from an all-time high of $1.1 billion in 1987. Since then, FTS financing has increased significantly to an estimated $96 million in 1994 and $123 million in 1995. NRCan forecasts that FTS financing is likely to be $160 million in 1996. It could possibly reach $180 million if FTS financing is in line with junior mining exploration intentions, as captured by the federal-provincial survey.

A number of factors have contributed to this sharp rise in FTS financing, including: the discovery of the large Voisey's Bay nickel-copper-cobalt deposit in Labrador, which has resulted in a major increase in exploration for such deposits in Labrador and also to a broader upsurge of Canadian mineral exploration; the intensive search for diamonds and the discovery of at least 10 highly promising diamond deposits; relatively strong metal prices over the past two years; and general market enthusiasm for junior mining stocks.

At the request of the mineral exploration community, the federal government, in its 1996 budget, increased the flow-through share "look-back" period from 60 days to one year. This measure allows tax write-offs for exploration expenditures that take place up to a full year, as opposed to 60 days, after the calendar year in which the FTS financing was raised. By allowing companies more time to undertake exploration activity related to FTS financing, the "look-back" extension should improve the efficiency of such exploration programs.

2. Diamond Drilling Activities

2.1 INTRODUCTION

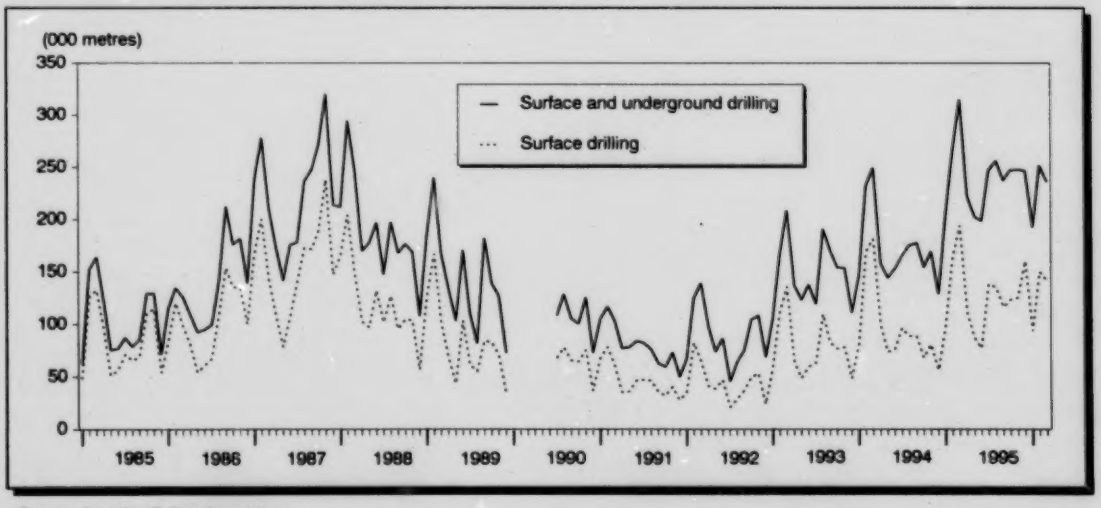
Diamond drilling is an essential component of exploration for nearly all mineral properties in Canada, from the anomaly investigation stage to the deposit delineation and deposit definition stages. That is why diamond drilling statistics constitute a valuable indicator of recent levels of Canadian mineral exploration activity.

2.2 OVERVIEW OF DRILLING ACTIVITY

2.2.1 Statistical Background

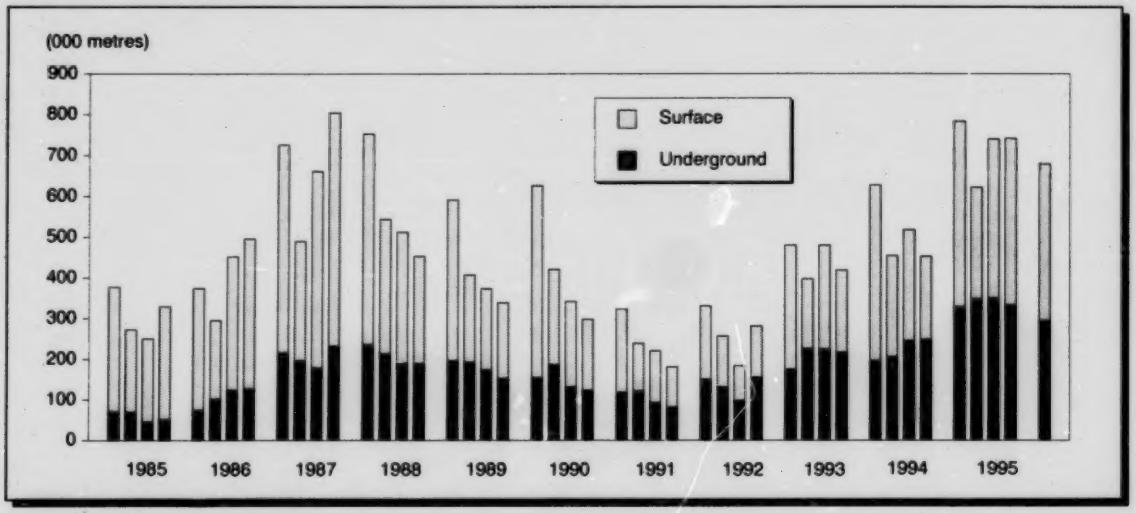
The Canadian Drilling Association (CDA) gathers monthly diamond drilling statistics from its member companies. Available CDA statistics cover about 50-60% of total Canadian contract diamond drilling activity. Although incomplete, they provide a reasonable and up-to-date indication of recent national mineral exploration activity trends. CDA drilling statistics are depicted in **Figure 5** (monthly, 1985-96), **Figure 6** (quarterly, 1985-96) and **Figure 7** (yearly, 1973-95). In addition, a comprehensive 20-year graph (**Figure 8**) depicts total Canadian contract drilling up to 1994, as reported annually to NRCan by drilling contractors and published in Statistics Canada's catalogue no. 26-201. As well, the federal-provincial survey of mining and exploration companies includes all metres drilled and expenditures reported by companies for their "own account" and contracted drilling work. **Figure 9** shows a comparison between these three sets of diamond drilling information.

Figure 5
Surface and Underground Drilling by Month, January 1985 to March 1996



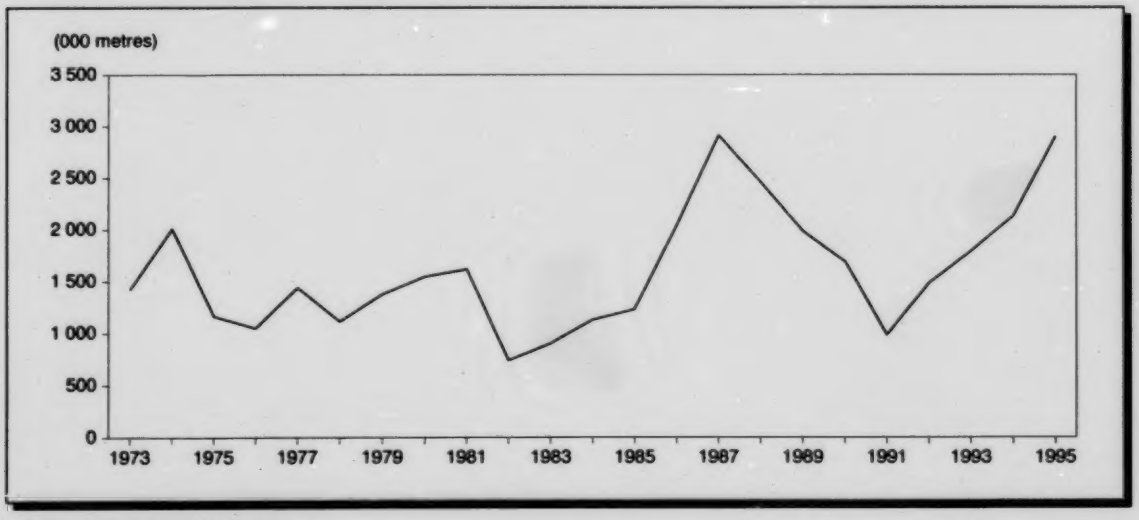
Source: Canadian Drilling Association.
Notes: CDA data are incomplete because not all member companies report their drilling. Monthly data were not available for the period January to June 1990 because final CDA statistics for this period were released only as a six-month total.

Figure 6
Surface and Underground Drilling by Quarter, 1985-96



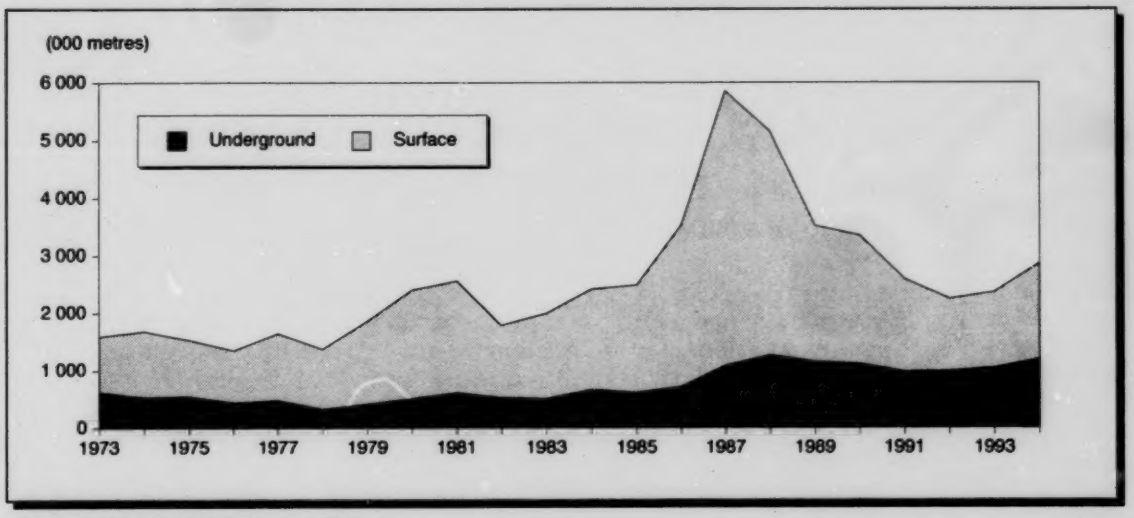
Source: Canadian Drilling Association.
Note: CDA data are incomplete because not all member companies report their drilling.

Figure 7
Surface and Underground Drilling by Year, 1973-95



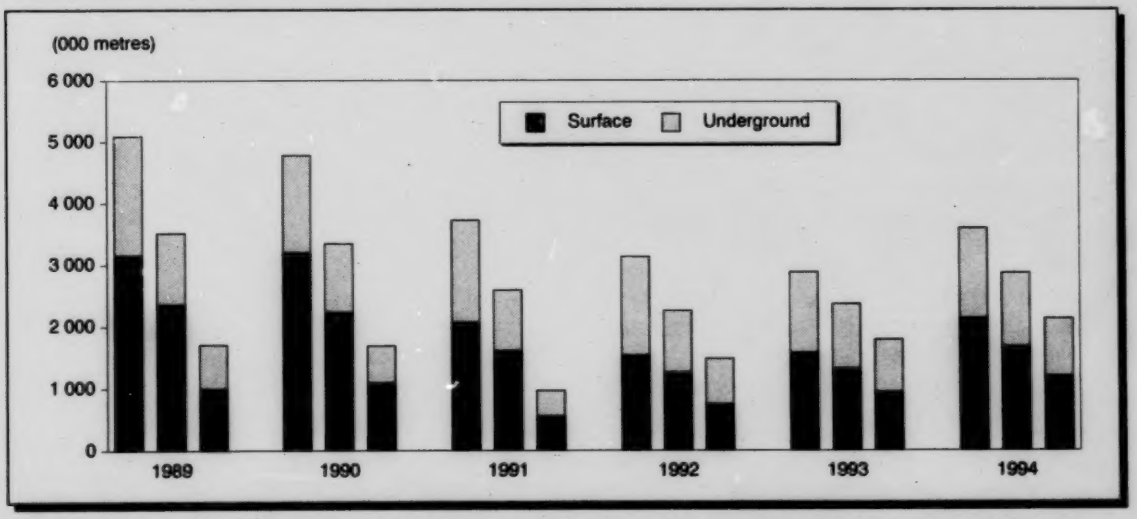
Source: Canadian Drilling Association.
Note: CDA data are incomplete because not all member companies report their drilling.

Figure 8
Surface and Underground Drilling, Contract Diamond Drilling Operations, 1973-94



Source: Statistics Canada, catalogue no. 26-201.
Notes: Data refer to SIC 0921. 1994 is the latest year for which data are available.

Figure 9
Comparison of Three Diamond Drilling Surveys, 1989-94



Sources: Federal-provincial survey of mining and exploration companies (left bar in each cluster); contract diamond drilling survey (middle bar in each cluster); Canadian Drilling Association (right bar in each cluster).
Note: All data include mine-site development drilling.

Exploration and mine-site development drilling are included in the federal-provincial survey to allow a fair comparison with the other two sets of statistics, which include such costs. Development drilling (mainly underground) consists of drilling aimed at establishing replacement ore reserves at producing mines.

Although these three sources provide different annual results (**Figure 9**), the same overall trends are observable in the three surveys over the period 1989-94. However, there is one inconsistency between the NRCan surveys and the CDA survey. For the CDA survey, the low was reached in 1991 instead of 1992, and the years 1989 and 1990 may have been underestimated.

2.2.2 Canadian Drilling Association Results

As can be seen from **Figure 6**, each of the four years (1988, 1989, 1990 and 1991) exhibited a similar pattern of diminishing diamond drilling throughout the year, with metres drilled in the first quarter of each year higher than metres drilled in the final quarter of the previous year (except for 1988). This general quarterly decline in drilling throughout the years continued until the third quarter of 1992 when metres drilled in the fourth quarter increased relative to the third quarter.

From 1988 to 1992, drilling peaked consistently during the first quarter. The explanation is twofold: (1) in each of those years, flow-through share funds from the previous year were carried over into January and February; and (2) much of the drilling must be done during the winter months on frozen lakes and on areas of muskeg that are generally inaccessible to drilling equipment at other times of the year. The general pattern of decreasing quarterly drilling throughout the year in 1988, 1989, 1990 and 1991 contrasts with the pattern of 1986 and 1987 when diamond drilling levels in the second half of the year were higher than in the first half because of the increasing availability of flow-through share funding.

Total metres drilled in 1993 were considerably higher than in 1992, with further increases in 1994 and 1995 (**Figure 7**). Metres drilled in the first quarter of 1996 are somewhat lower than in the first quarter of 1995, even though company exploration spending intentions for 1996 of $945 million are substantially higher than the preliminary $763 million of exploration expenditures in Canada in 1995.

2.2.3 Exploration Drilling

In 1994, 2 231 654 metres (m) of surface exploration drilling were completed in Canada, up by 25% from the 1 789 795 m drilled in 1993. Diamond drilling (2 018 301 m) constituted 90% of the total metres of surface drilling. Québec, Ontario, British Columbia and Manitoba, in decreasing order of importance, jointly accounted for 75% of total surface drilling activity (**Figure 10**).

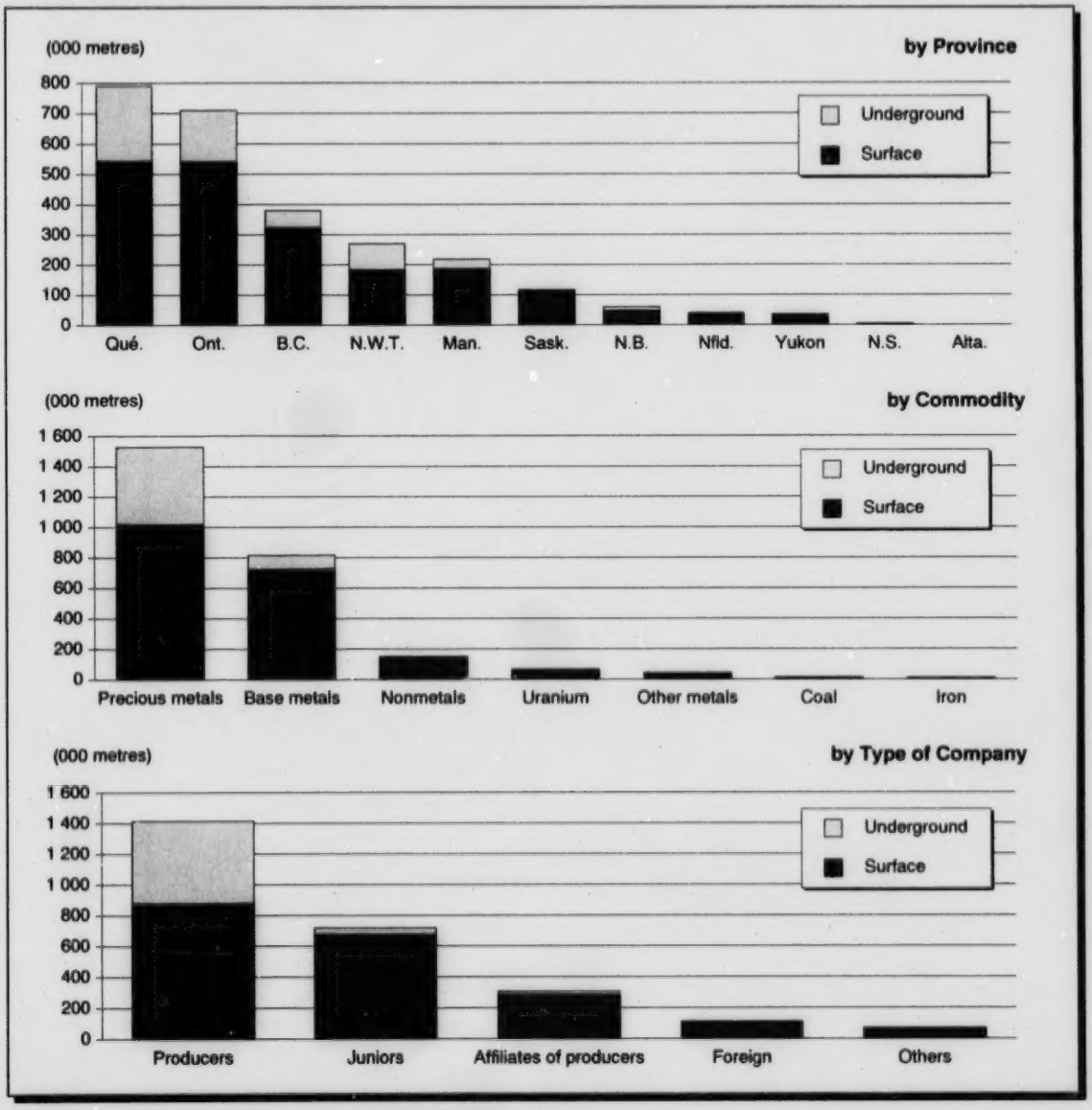
Underground exploration drilling (both diamond drilling and other types of underground exploration drilling) totalled 608 194 m, up by 43% from the 424 580 m drilled in 1993. Together, Québec (245 825 m), Ontario (169 868 m) and the Northwest Territories (86 894 m) accounted for 83% of total underground exploration drilling.

Senior companies reported 66% of the total metres of surface diamond drilling and junior companies reported 34%. Some 93% of underground diamond drilling was reported by senior companies (**Figure 10**). Of the total surface metres drilled (diamond drilling), 50% was undertaken in the search for precious metals, 36% for base metals, and 7% for nonmetals (**Figure 10**). Underground drilling was carried out in the search for precious metals (84%) and base metals (15%). About 40% of annual field exploration expenditures is normally dedicated to drilling.

Current dollar costs per metre of exploration drilling in Canada can be calculated for the period 1985-94 inclusive, using data from the federal-provincial exploration survey (**Table 1**). Such

data are not available for years prior to 1985. These costs may exceed the actual amounts paid to drilling contractors as some companies may have included costs associated with drilling such as geological logging and assaying of core. These average drilling costs include both surface and underground drilling expenditures; surface drilling costs are normally significantly higher than those for underground drilling.

Figure 10
Exploration Diamond Drilling, Surface and Underground, 1994



Source: Federal-provincial survey of mining and exploration companies.
Note: Exploration includes general plus mine-site exploration, which includes only the search for new mines.

TABLE 1. CANADA, EXPLORATION DRILLING, SURFACE AND UNDERGROUND, 1985-94

Year	Diamond Drilling			Other Drilling[1]		
	Metres Drilled	Total Cost	Cost Per Metre	Metres Drilled	Total Cost	Cost Per Metre
	(000)	($000)	($)	(000)	($000)	($)
1985	2 531	185 994	73	270	10 770	40
1986	3 616	248 579	69	55	3 385	62
1987	6 221	509 950	82	262	18 544	71
1988	6 206	477 509	77	211	10 466	50
1989	3 940	291 399	74	297	9 471	32
1990	3 702	281 982	76	241	12 575	52
1991	2 341	174 789	75	234	13 133	56
1992	1 889	140 765	75	139	6 544	47
1993	1 932	146 780	76	282	12 879	46
1994	2 626	184 068	70	213	12 592	59

Source: Federal-provincial survey of mining and exploration companies.
[1] Drilling methods such as percussion exploration drilling, reverse circulation drilling for overburden, and rotary drilling (such as used in petroleum exploration) employed in exploration for coal, potash, salt, gypsum and similar layered mineral commodities.

3. Claim Staking

The area of mineral claims staked in Canada in 1995 was almost 16 million hectares (ha), the fourth largest area ever, and only 1% less than the area staked in 1994.

3.1 PROVINCIAL/TERRITORIAL BREAKDOWN

Compared to 1994, the area staked in 1995 (**Table 2**) increased substantially in Newfoundland (by a factor of 12). Smaller increases were reported in Québec (by a factor of 1.8), the Yukon (by a factor of 1.3), the Northwest Territories (by a factor of 1.3), Nova Scotia (by a factor of 1.2), and British Columbia (by a factor of 1.1).

Provincial and territorial mining recorders have advised that: in Newfoundland, the increased staking is a direct consequence of the important Voisey's Bay discovery; in Québec, of permits issued for gold; in the Yukon, of a staking rush following the discoveries of the Kudz Ze Kayah and Wolverine lead-zinc-copper-silver-gold deposits; and, in the Northwest Territories, of interest in diamonds and gold.

The areas staked in Newfoundland (39% of the Canadian total), the Northwest Territories (24%) and Alberta (11%) represent a combined area of 11.6 million ha, or 74% of the total area staked in Canada in 1995. Areas staked were down by about 81% in Saskatchewan, by 79% in Manitoba, by 75% in Alberta, by 9% in Ontario and by 5% in New Brunswick. The decline that occurred in Alberta, and perhaps in Saskatchewan, was due to the fact that most of the land with the potential for diamond discovery had already been staked. For example, about 70% of Alberta had already been staked for diamond exploration.

TABLE 2. AREA OF NEW MINERAL CLAIMS[1] STAKED IN CANADA, 1994 AND 1995

	1994		1995	
	(hectares)	(%)	(hectares)	(%)
Newfoundland	513 903	3.2	6 106 617	38.7
Nova Scotia	154 123	1.0	183 893	1.2
New Brunswick	63 680	0.4	60 464	0.4
Québec	840 922	5.3	1 474 196	9.4
Ontario	734 400	4.6	668 832	4.2
Manitoba	998 435	6.3	210 460	1.3
Saskatchewan	1 815 997	11.5	340 881	2.2
Alberta	6 750 000	42.6	1 665 000	10.6
British Columbia	774 340	4.9	845 550	5.4
Yukon	280 171	1.8	376 844	2.4
Northwest Territories	2 929 482	18.5	3 839 299	24.3
Total	15 855 453	100.0	15 772 036	100.0

Source: Provincial and territorial mining recorders.
1 Excludes coal.
Note: Percentages do not add to 100 due to rounding.

4. Exploration for Diamonds

4.1 INTRODUCTION

The discovery in 1992 of diamond-bearing kimberlites at Lac de Gras in the Northwest Territories initiated a staking rush of unprecedented magnitude in Canada. Diamond exploration soon extended to many parts of northern Canada and involved numerous junior and senior companies, some of international renown. The tremendous amount of money spent on diamond exploration has been a major factor in explaining the rebound in exploration spending that has occurred in Canada over the past few years.

Canada is now poised to develop its first diamond mine at Lac de Gras while other projects could also become mining operations in the not too distant future. Many projects are now at the advanced stage of exploration or even at the deposit appraisal stage. The nature of the exploration work has evolved from a grassroots type to advanced exploration since the early days of the diamond rush, and diamond exploration expenditures still account for a significant portion of Canadian exploration spending.

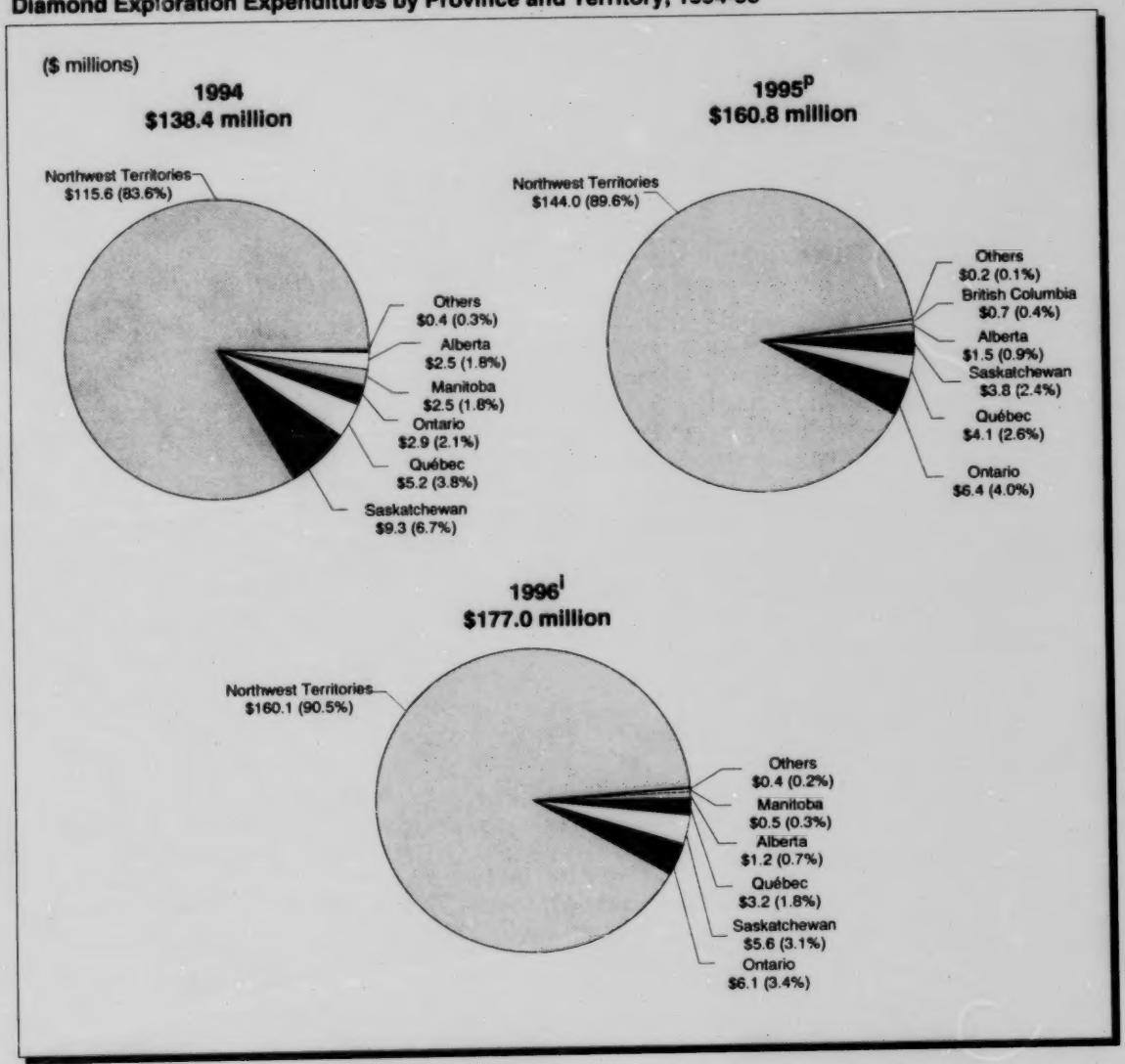
4.2 STATISTICAL SUMMARY

Expenditures dedicated to diamond exploration for each of the years from 1993 to 1996 accounted for approximately 20% of total Canadian exploration expenditures. Over this four-year period, an estimated total of $563 million was spent on diamond exploration, including $138 million in 1994, and estimated totals of $161 million for 1995 and $177 million for 1996 (**Figure 11**). The Northwest Territories was the target of most diamond exploration expenditures with 84% of the $138 million spent in Canada in 1994. This share will likely reach 90% in each of 1995 and 1996.

In 1994, 102 companies, excluding prospectors, were operators (83% being juniors) of diamond exploration projects (**Figure 12**). That number was slightly higher than the 100 reported in 1993. In 1995 and 1996, about 60 and 50 companies (80% being juniors), respectively, were active in diamond exploration (**Figures 12 and 13**). Despite the high proportion of junior project operators, 75% of 1995 and 1996 expenditures were reported by senior project operators compared to a 55% contribution in 1994.

In 1994, four major project operators, active mainly in the Northwest Territories, contributed about 64% of total Canadian diamond exploration expenditures. These project operators were BHP Minerals Inc., Lytton Minerals Limited, Kennecott Canada Inc., and Monopros Limited (De Beers). In 1995 and 1996, the same four major project operators will likely report about 80% of all diamond exploration expenditures on advanced exploration projects in the Northwest Territories. Even though a smaller number of project operators have reported expenditures for 1995 and 1996, they accounted for an even larger proportion of total diamond exploration expenditures in the Northwest Territories.

Figure 11
Diamond Exploration Expenditures by Province and Territory, 1994-96

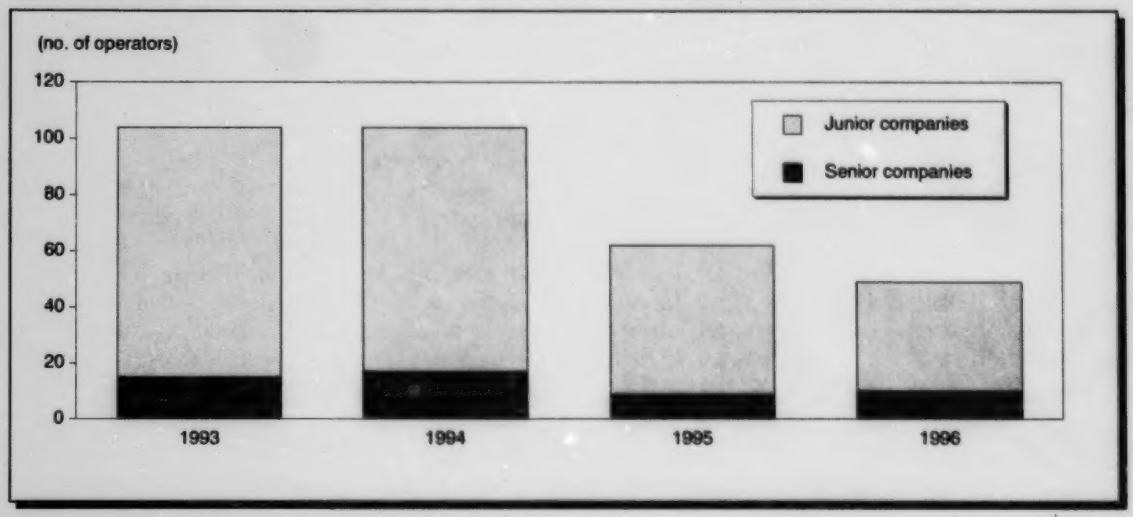


Source: Federal-provincial survey of mining and exploration companies.

[I] Company spending intentions; [P] Preliminary estimate.

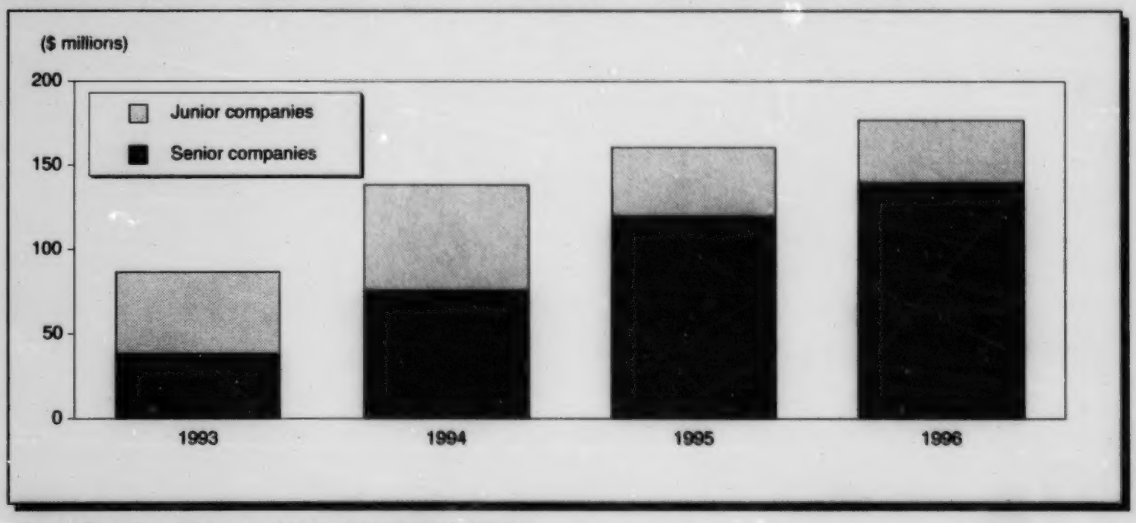
Note: "Others" includes Newfoundland and either British Columbia or Manitoba.

Figure 12
Number of Junior and Senior Project Operators Active in Diamond Exploration, 1993-96



Source: Federal-provincial survey of mining and exploration companies.
Note: 1995 data are preliminary estimates; 1996 data are company spending intentions.

Figure 13
Diamond Exploration Expenditures by Junior and Senior Project Operators, 1993-96



Source: Federal-provincial survey of mining and exploration companies.
Note: 1995 data are preliminary estimates; 1996 data are company spending intentions.

4.3 ADVANCED PROJECTS[1]

In November 1995, there were 616 diamond exploration properties in Canada (**Figure 14**). More than one-third of these properties were located in the Northwest Territories. Saskatchewan, Ontario, Alberta and Québec are the other principal provinces for diamond exploration. There was also some activity in British Columbia, Manitoba, Labrador and the Yukon.

Four diamond properties, all of them in the Northwest Territories, currently appear to have the highest production potential. These properties are: Lac de Gras, Diavik, AK, and Jericho. Each of these four properties is described below in more detail.

The omission of other diamond properties from this list does not imply that they lack economic potential, but only that currently published information does not clearly indicate that such properties have significant economic potential. Publicly available diamond content information for diamondiferous kimberlite deposits on the four above-mentioned properties is provided in **Figure 15**. Grades for several of the kimberlites are based on samples of only a few tonnes and are likely to change as larger bulk samples are taken on these pipes.

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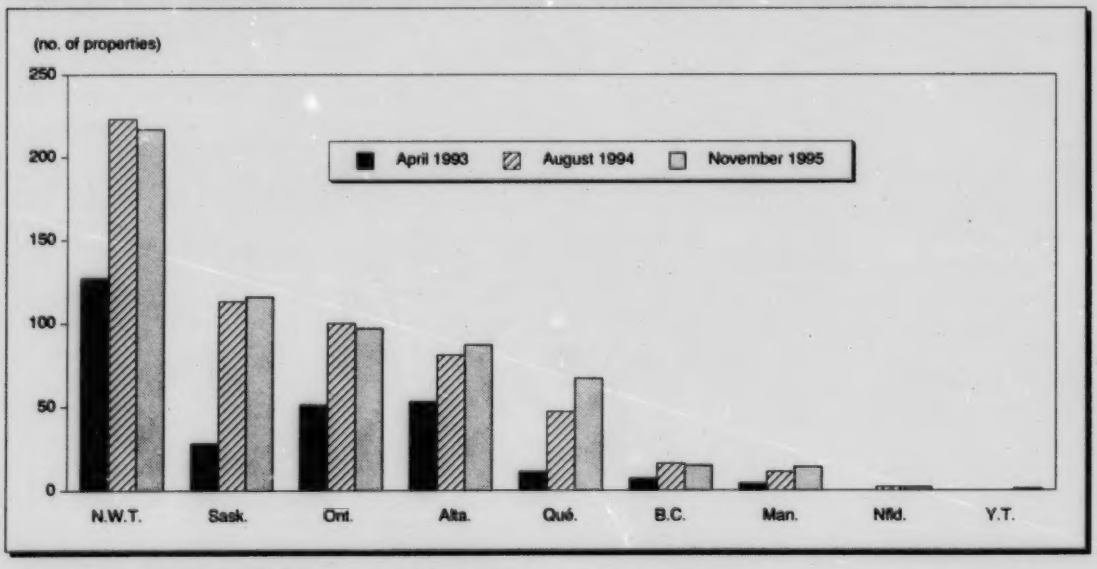
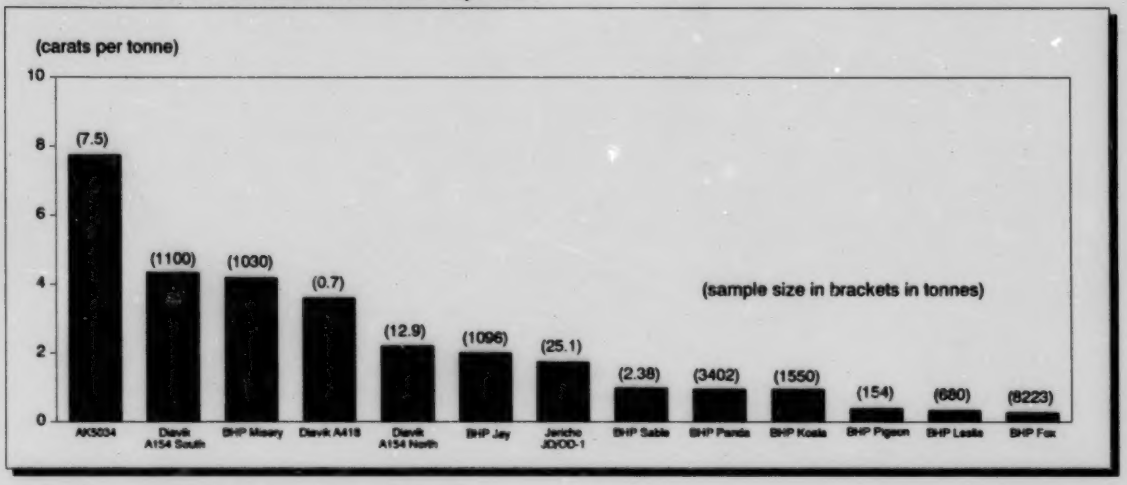
[1] The information provided in this section was current as of April 15, 1996. The reader is cautioned that reported grades for Canadian deposits are based on samples that may not be typical of the entire deposit.

Figure 14
Exploration for Diamonds in Canada, Distribution of Properties by Province and Territory



Source: Natural Resources Canada, based on MIN-MET CANADA database and used under licence.

Figure 15
Grades of Selected Canadian Diamond Deposits



Source: Natural Resources Canada, based on published data.

4.3.1 Lac de Gras

In 1995, exploration continued on the Lac de Gras property of BHP and its associates in the Northwest Territories. A total of 66 kimberlite intrusions have now been found on this property, at least 42 of which are known to contain diamonds. Exploration for additional kimberlites continues. BHP has now spent between $150 million and $200 million on the property, much of it on exploration, bulk sampling using diamond drilling and/or underground workings, feasibility studies and environmental studies.

BHP now owns 51% of the property and the other 49% is held by the Blackwater Group (DiaMet Minerals Ltd. (29%), Charles E. Fipke (10%) and Stewart Blusson (10%)). The project operator, BHP, has not yet published ore reserve data for the five diamond pipes it currently plans to mine. **Table 3** lists the available bulk sample results for combined bulk sample data from each of the Panda, Misery, Koala, Fox and Leslie pipes, and for the Pigeon, Jay and Sable pipes (not currently scheduled for mining).

TABLE 3. BHP MINERALS CANADA LTD./BLACKWATER GROUP BULK SAMPLE DIAMOND EVALUATIONS FOR EIGHT DIAMOND DEPOSITS ON THE LAC DE GRAS PROPERTY

Pipe	Total Tonnes Sampled	Total Carats Recovered	Average Grade	Average Value	Average Value
			(carats/tonne)	(US$/carat)	(US$/tonne)
Panda	3 402	3 244	0.95	130	124
Misery	1 030	4 313	4.19	26	109
Koala	1 550	1 465	0.95	122	116
Fox	8 223	2 199	0.27	125	34
Leslie	680	223	0.33	..	..
Pigeon[1]	154	60	0.39	51	20
Jay[1]	238	477	2.00	..	..
Sable[1]	1 096	1 070	0.98	64[a]	62

Source: Natural Resources Canada, from company reports.
. . Not available.
[a] The $64/carat value includes a gem-quality diamond weighing 9 carats. If this stone is excluded, the average value is $48/carat and the average value per tonne is $47.
[1] The Pigeon, Jay and Sable deposits are not currently scheduled for mining.

Bulk samples were also taken and tested from four other pipes during 1995 (Cub, Grizzly, Arnie and Mark), but diamond contents and initial quality assessment of the diamonds recovered indicate that these four pipes are of insufficient economic value to warrant additional work at this time. This has also been the case for several other pipes from which small bulk samples were previously taken.

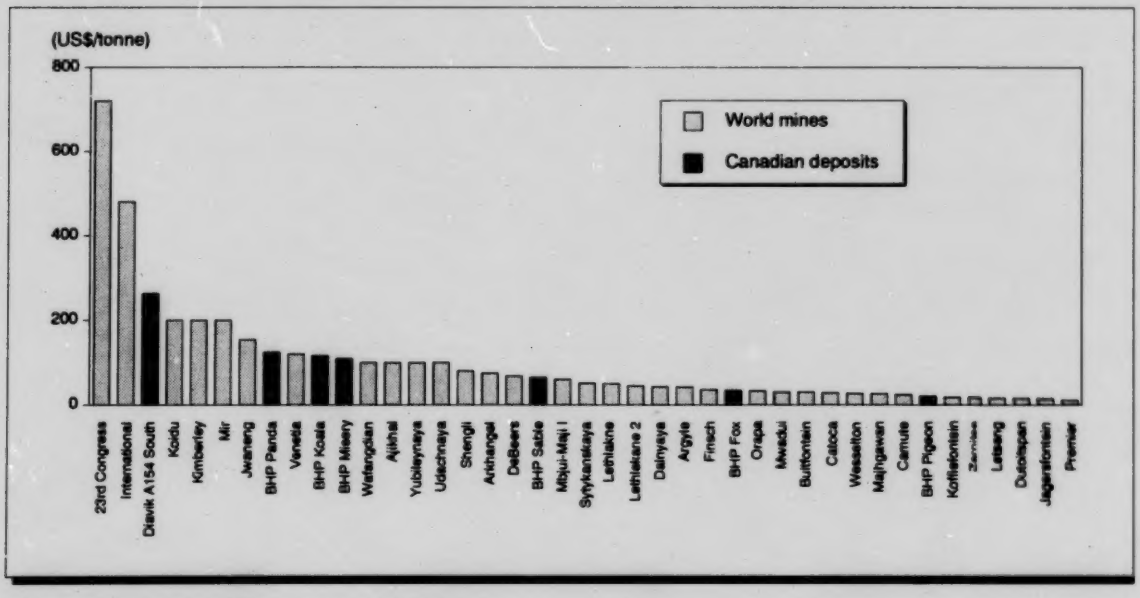
An Environmental Impact Statement for the proposed mining project was submitted to the federal Environmental Assessment Review Panel in July 1995. The Panel recommended that the project go ahead, subject to some recommendations. Production is unlikely to begin until late 1998 or early 1999 because substantial quantities of construction supplies would have had to have been shipped over the winter road in the 1995/96 winter season for the property to be ready for production in 1997.

Current plans are that the operation will process 9000 tonnes per day (t/d) of ore for the first nine years of production, increasing to 18 000 t/d for the subsequent 16 years. These proposed ore throughput rates suggest that jointly the Panda, Misery, Koala, Fox and Leslie pipes have ore reserves totalling some 130 million tonnes (Mt). The average value per tonne of each of the Panda, Misery and Koala deposits is in excess of US$100 (**Table 3**), which indicates that these three deposits appear to be among the world's highest-grade diamond deposits in terms of per-tonne values (**Figure 16 and Table 4**). Projected revenues for this project are in the range of $500 million per year over the currently planned 25 years of operation.

4.3.2 Diavik

A total of 41 kimberlite pipes have been discovered on the combined diamond properties of Kennecott and Aber Resources Ltd., of which 13 are known to contain diamonds. Notable results have been obtained by drilling the A-154 South kimberlite, including the recovery of a 1.76-carat (ct) diamond. A 1000-m decline has been driven to a depth of 155 m below surface, and a 3000-t bulk sample was taken during the winter of 1995/96 with the goal of recovering at least 10 000 ct of diamonds for valuation. A total of $23.5 million is being spent on this phase of the project.

Figure 16
Recoverable Values of World Diamond Mines and Canadian Diamond Deposits



Source: Natural Resources Canada, based on published data.

An estimated resource of 8.4 Mt to a depth of 250 m (and as much as 20 Mt if the ore is projected to a depth of 650 m), with an average diamond value of $77.68/ct and ore valued at $350/t (based on a 56.6-t mini-bulk sample that yielded 255.6 ct of diamonds grading 4.5 ct/t), makes this diamond deposit potentially one of the world's highest grade deposits.

Approximately 1300 t of the bulk sample is being processed at Kennecott's diamond processing plant in Yellowknife and the remaining 1700 t was shipped to the BHP/Diamet Koala plant, where processing had been completed by early June with the concentrate shipped to Yellowknife for final processing. The first 46 t of this bulk sample (which was diluted with wallrock and grout cement) yielded 1.8 ct of diamonds per tonne; a subsequent 1100.3 t yielded 4.34 ct/t. The largest diamond recovered from the 1100.3 t weighs 14.75 ct and the largest gem-quality diamond recovered weighs 4.95 ct.

TABLE 4. AREA, GRADE AND VALUE OF THE WORLD'S ECONOMIC KIMBERLITES

Pipe	Surface Area	Grade	Average Value		Deposit Size: Economic Tonnage to a Depth of 120 m
	(hectares)	(carats/tonne)	(US$/carat)	(US$/tonne)	(million tonnes)
Bultfontein	9.7	.40	75	30	24
Camute	9.3	.12	200	24	23
Dutoitspan	10.8	.20	75	15	26
Finsch	18.0	.90	40	36	44
Jagersfontein	10.0	.70	200	14	24
Jwaneng	45.0	.54	100	154	110
Koffiefontein	10.3	.12	150	18	25
Lethlakne	11.6	.30	150	50	28
Letseng	16.0	.04	400	16	10
Majhgawan	12.0	.12	220	26	16
Premier	32.2	.30	35	10	78
Udachnaya	20.0	1.00	100	100	49
Venetia	12.7	1.20	100	120	31
Yubileynaya	40.0	1.00	100	100	98
Wesselton	8.7	.27	100	27	21
Zarnista	21.5	.15	120	18	24
Argyle	46.0	6.00	7	42	45
Arkhangel	118.0	.75	100	75	116
Catoca	66.0	.46	60	28	65
Mbjui-Maji I	18.6	6.00	10	60	18
Mwadui	146.0	.20	150	30	143
Orapa	106.0	.67	50	33	104
Mir	6.9	2.00	100	200	17
Sytykanskaya	6.0	.60	85	51	15
Dalnyaya	5.4	.50	85	43	13
DeBeers	5.1	.90	75	68	12
Kimberley	3.7	1.00	200	200	9
Lethlekane 2	3.6	.30	150	45	9
Ajikhal	3.0	1.00	100	100	7
Dokolwayo	2.8	. .	. .	. .	. .
International	1.7	4.00	120	480	4
23rd Congress	1.5	6.00	120	720	3
Wafangdian	1.5	.85	120	100	3
Shengli	0.4	1.00	80	80	1
Koidu	0.4	1.00	200	200	1

Source: Adapted from A. Janse, 1993, "The Aims and Economic Parameters of Diamond Exploration," in "Diamonds: Exploration, Sampling and Evaluation," published by the Prospectors and Developers Association of Canada, Toronto.
. . Not available.

Within 750 m of the A-154 South pipe are the A-154 North and A-418 kimberlite pipes. A-154 North has a preliminary resource of 5.3 Mt, to a depth of 250 m, grading 2.2 ct/t. A 0.707-t sample from A-418 had a grade of 3.6 ct/t, with the largest diamond recovered weighing 0.41 ct. The proximity of A-154 North and A-418 to the A-154 South kimberlite enables underground sampling of these two kimberlites from the original A-154 decline.

The proximity of the pipes will make the economics of underground mine development more attractive. Some 227 m of a planned 600-m branch from the existing A-154 South decline had been driven towards the A-418 pipe by early June so that a 3000-t bulk sample could be taken from A-418 at 145 m below Lac de Gras later in 1996.

If the results of the 1996 underground bulk sample on A-154 South continue to confirm the results of the mini-bulk sample taken in 1995 and of the initial 1100 t, it seems highly likely that Kennecott/Aber will have at least one future high-grade diamond mine, and probably more, on the Diavik property. The major uncertainty for the development of these mines is the cost of the major dike that would have to be constructed to permit open-pit mining beneath the waters of Lac de Gras.

Mini-bulk samples were collected using large-diameter core drilling of the A-418 (63 t), A-154 North (68 t) and A-21 (8.5 t) kimberlites.

4.3.3 AK

On the AK property, 150 km southeast of Lac de Gras, Mountain Province Mining Inc. (50%), together with its partners Glenmore Highlands Inc. (40%) and Camphor Ventures Inc. (10%), have drilled the 5034 kimberlite pipe. The drilling done to date has indicated an estimate of 18.3 Mt of diamondiferous kimberlite to a depth of 300 m. A 1.703-t sample of this kimberlite, comprising a composite sample of core from the 15 drill holes processed up to August 29, 1995, yielded 8.4 ct of recovered diamonds per tonne, of which 7.5 ct comprise macrodiamonds larger than 1 mm in diameter.

While these results are highly encouraging, the sample is too small to provide reliable information on size distribution and the quality and value of diamonds typically contained in the 5034 kimberlite. An initial 100-t bulk sample was taken during the early winter of 1995/96 using a large-diameter diamond drill. The first 5.8 t processed yielded 7.565 ct of macrodiamonds per tonne. Diamonds larger than 1 mm grade 5.369 ct/t, while those larger than 2 mm grade 1.831 ct/t. These diamonds are reported to include a 0.9-ct stone and several coloured diamonds.

4.3.4 Jericho

Lytton Minerals Limited and its various partner companies have discovered a total of five diamond-bearing kimberlite pipes on their properties in the Northwest Territories. Kimberlite core from six delineation drill holes into the JD/OD-1 kimberlite pipe, which is owned by Lytton and New Indigo Resources Inc., weighing a total of 1.115 t, yielded 5.320 ct of recovered diamonds per tonne. Of these diamonds, 4.882 ct are macrodiamonds and the balance are microdiamonds. The diamond content of this small sample is exceptionally high, but a much larger bulk sample will be needed to determine whether this is an economical deposit.

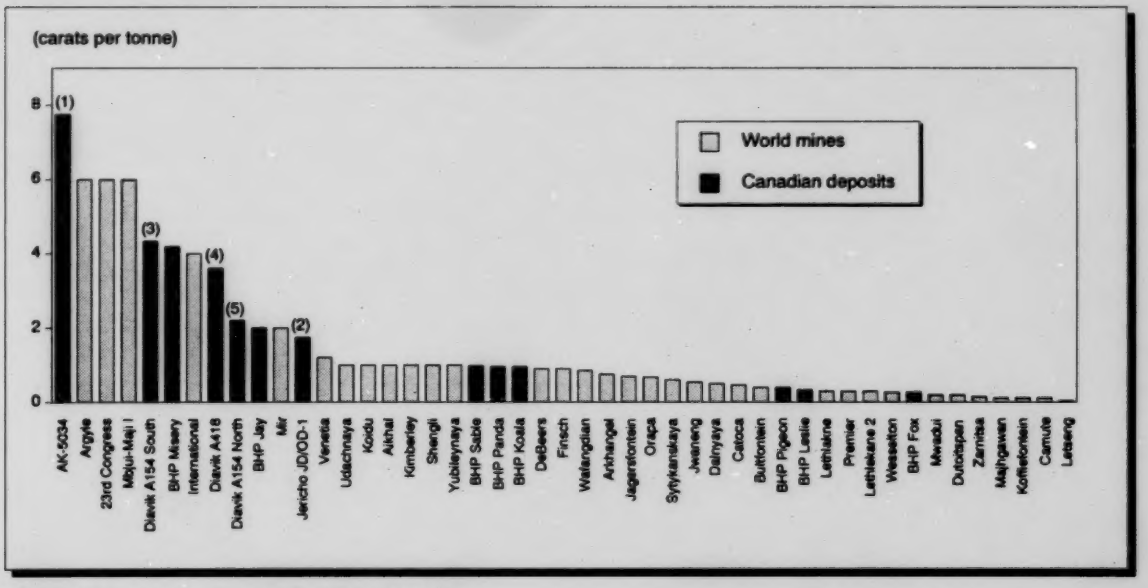
Macrodiamonds of 1.0 to 2.0 mm in size account for 3.610 ct, and those greater than 2.0 mm account for 1.165 ct. Eighty percent of the diamonds were reported to be gem quality. Delineation drilling is continuing on the JD/OD-1 kimberlite and on the JD/OD-2 kimberlite located a short distance to the north. A large-diameter drill has been operating on the property since August 11, 1995, accumulating core for an initial 100-t bulk sample of the JD/OD-1 kimberlite. As of April 29, 1996, a total of 75.6 t of this bulk sample had been extracted and 24.0 t of it had been processed to yield 38.3 ct of diamonds (1.6 ct/t).

A preliminary evaluation of diamonds recovered from the first 12 t of kimberlite processed yielded an average value of US$95/ct; over 55% were gem quality. Included in the diamonds recovered from the first 12 t were five stones of between 0.85 and 1.05 ct each. It is currently estimated that the JD/OD-1 pipe comprises a resource of 15 Mt to a depth of 750 m. A 15 000-20 000-t underground bulk sample is to be taken and processed at a processing plant to be located at the Lupin gold mine.

4.4 COMPARISON OF RECOVERABLE GRADES AND VALUES OF CANADIAN DIAMOND DEPOSITS TO WORLD DIAMOND MINES

Recoverable diamond contents of more than half of the known Canadian diamond deposits are among the world's highest (**Figure 17**). Similarly, per tonne recoverable values of a number of the Canadian deposits for which such information is currently available are also high (**Figure 16**).

Figure 17
Recoverable Grades From World Diamond Mines and Canadian Diamond Deposits



Source: Natural Resources Canada, based on published data.
(1) AK-5034 grade based on a sample of 7.5 t of drill core. (2) Jericho JD/OD-1 grade based on a sample of 25.1 t of drill core. (3) Diavik A154 South grade based on a sample of 1100 t of drill core. (4) Diavik A418 grade based on a sample of only 0.7 t of drill core. (5) Diavik A154 North grade based on a sample of 12.9 t of drill core.

5. Regional Outlook

5.1 INTRODUCTION

This section presents comments from provincial and territorial officials on recent exploration activity and gives an indication of what they expect for 1996. Some of the exploration expenditure results mentioned in the following section by the different provincial and territorial authorities may differ from those reported under Section 1 and Section 6 of this report (official federal-provincial figures released by NRCan). The explanation is that: for Québec, the figures include expenditures by the Québec Ministry of Natural Resources which are excluded from all NRCan published totals; and for Saskatchewan and the Yukon, their respective surveys are not based on the same set of definitions used in the national survey.

5.2 NEWFOUNDLAND AND LABRADOR

Mineral exploration in Newfoundland and Labrador in 1995 increased by 471% from 1994 levels as a direct result of the Voisey's Bay nickel-copper-cobalt discovery.

Total expenditures on mineral exploration in 1995 were approximately $70.8 million, up from $12.4 million in 1994. The 1994/95 statistics for claims staked (22 256/248 707), claims in good standing (36 698/280 750) and diamond drilling (46 626 m/128 910 m) also reflect this increase. First-quarter 1996 claims statistics stand at 2531 new claims staked and 282 077 claims in good standing. Expenditures for 1996 are forecast by the federal-provincial survey to be $111 million. The forecast for diamond drilling in 1996 is 150 000 m, reflecting a focus on both grassroots and advanced projects. Most exploration efforts are now being carried out by the junior sector and prospectors with senior mining firms a close second. This is a significant reversal from previous years.

On November 3, 1994, Diamond Fields Resources announced a potentially significant occurrence of base-metal mineralization containing nickel, copper and cobalt at Voisey's Bay, Labrador. The original discovery – the Ovoid – contains fully diluted open-pit mineable reserves estimated at 31.7 Mt grading 2.83% nickel, 1.68% copper and 0.12% cobalt. On October 8, 1995, Diamond Fields announced the discovery of the Eastern Deeps and Voisey's Bay West zones. Drilling up to April 1996 indicates that the Eastern Deeps combined with the Ovoid contain in excess of 150 Mt. Drilling is ongoing on these targets, and exploration on outlying claims is continuing. In March 1995, Teck Corporation acquired 10.4% of Diamond Fields for $108 million. In June 1995, Inco Limited purchased 25% of Voisey's Bay Nickel Company Ltd. and 7% of Diamond Fields for $525 million. In April 1996, Inco Limited announced that it had entered into an agreement with Diamond Fields to acquire all common shares of Diamond Fields that it does not currently own. The deal consists of a combination of cash and shares of Inco and Voisey's Bay Nickel Company valued at approximately $4.5 billion. This constitutes one of the largest corporate deals in Canadian history.

The Voisey's Bay discovery caused exploration activity in Labrador to skyrocket from less than $1 million in 1994 to approximately $50 million in 1995 and to a forecast $80 million in 1996. Mineral rights to more than 250 000 claims are held by some 200 companies or individuals with some 30 to 40 companies expected to be active in the region. A plethora of airborne reconnaissance surveys, ground proofing and preliminary drilling programs was completed in 1995 with much further work anticipated in 1996.

TABLE 5. NEWFOUNDLAND AND LABRADOR EXPLORATION STATISTICS, 1988-96

	1988	1989	1990	1991	1992	1993	1994	1995p	1996f
					(dollars)				
Annual exploration expenditures	41 155 481	36 200 009	23 274 537	12 064 993	11 140 752	8 905 864	12 396 462	70 838 000	111 000 000
Exploration field expenditures									
Base metals	16 079 333	8 141 579	8 065 645	7 022 790	5 948 578	3 719 325	5 216 623	64 226 300	..
Precious metals	21 154 136	16 420 301	9 195 651	1 876 256	1 285 629	1 867 878	3 613 526	5 371 500	..
Other	457 370	1 364 328	1 520 051	550 502	1 192 898	1 192 898	884 000	1 241 000	..
					(number)				
Claim staking									
Claims staked	26 606	17 571	10 421	7 411	5 118	6 855	22 256	248 707	15 000
In good standing	69 677	65 223	45 427	33 297	24 002	22 910	36 698	280 750	230 000
					(metres)				
Diamond drilling									
Production/development	17 449	16 355	8 884	6 850	819	16 982	7 260	8 107	10 000
Exploration	234 777	104 493	82 833	39 067	21 923	31 020	39 366	120 803	140 000
Total diamond drilling	252 226	120 848	91 717	45 917	22 742	48 002	46 626	128 910	150 000

Source: Newfoundland Department of Natural Resources.
.. Not available; f Forecast; p Preliminary.

Exploration activity on the island portion of Newfoundland also increased in 1995. Noranda Mining and Exploration Inc., in a joint venture with Brunswick Mining and Smelting Corporation Limited, continued to explore the AND Charter Lands in central Newfoundland for base metals. On August 28, 1995, the lands around the past producing high-grade Buchans deposits came open for staking. Several companies acquired a land position and are actively exploring. Underground exploration programs were completed at the Nugget Pond gold deposit on the Baie Verte Peninsula and at the Beaver Brook antimony deposit south of Gander in 1995. It is anticipated that these two deposits will be in production by late 1996/early 1997. Raymo Processing Limited, a wholly owned subsidiary of Electra Mining Consolidated Ltd., started producing gold from the Rambler tailings near Baie Verte using its newly constructed vat leach gold recovery plant in May 1996. Ming Minerals Inc. started mining the Ming West copper-gold deposit on the Baie Verte Peninsula late in 1995. Continued gold and base-metal exploration in the King's Point-Springdale area, increased gold exploration on the Avalon Peninsula, renewed interest in the St. Lawrence Fluorspar deposit, the production of magnetite east of St. Georges, and the re-opening of the Lower Cove limestone aggregate quarry are also considered very positive events.

The Mineral Industry Assistance Program (MIAP) under the Canada-Newfoundland Agreement on Mineral Development continued to provide training programs and grants to local prospectors as well as assistance to individuals and companies for feasibility/demonstration and infrastructure projects during the 1995/96 fiscal year. A total of $110 000 has been allotted by the Newfoundland government for the 1996/97 fiscal year and will be used to provide training programs and grants to local prospectors only. The locally based junior mining sector and independent prospectors are becoming well established and self-sustaining, and comprise a significant and growing component in the total exploration effort. The MIAP has been a valuable investment in this sector – an investment that is beginning to pay dividends as prospectors, with increasing frequency, make discoveries and joint-venture agreements.

The province, through the Newfoundland Exploration Assistance Program (NEXAP) and the Dimension Stone Incentive Program (DSIP), continued to provide cost-shared assistance on advanced projects to Newfoundland-based junior mining companies during the 1995/96 fiscal year. The NEXAP program supported companies up to a maximum of $80 000 per approved project. Individual companies were eligible for assistance on more than one project to a maximum of $160 000. The DSIP supported companies to a maximum of $20 000 per approved project. A total of $500 000 and $100 000 were allocated to NEXAP and DSIP respectively for the 1995/96 fiscal year. However, these programs are not funded for the 1996/97 fiscal year due to general government restraint.

The statistics in **Table 5** show the dramatic increase in exploration in Newfoundland and Labrador, which will peak at $111 million in the current year (1996).

5.3 NOVA SCOTIA

Mineral exploration activity in Nova Scotia during 1995 continued at roughly the same level as in the previous three years, with expenditures estimated at $1.8 million for 1995 compared with $1.7 million in 1994. Expenditures for 1996 are forecast to increase to approximately $2.26 million (**Table 6**).

Approximately 16 100 new and reissued claims were staked during 1995, up significantly from the 12 900 claims staked in 1994. Preliminary figures for new claims stand at approximately 8000 for the first quarter of 1996, up significantly from the roughly 2000 claims staked during the first quarter of 1995.

The amount of exploration drilling was down in 1995 with the completion of approximately 6700 m compared with a total of 7725 m in 1994. Exploration drilling is expected to increase modestly in 1996.

TABLE 6. NOVA SCOTIA MINERAL EXPLORATION STATISTICS, 1991-96

	1991	1992	1993	1994	1995	1996
Exploration expenditures (field + overhead, general + mine-site) ($)	4 532 000	3 258 000	1 797 000	1 714 000	1 836 000p	2 256 000f
Claim staking (new and reissued) (general + special licences, excluding closures and uranium licences) (no.)	18 777	11 965	10 193	12 900	16 067	20 000•
Exploration diamond drilling (metres)	11 504	12 710	6 221	7 725	6 700p	7 000f

Source: Nova Scotia Department of Natural Resources.
• Estimated; f Forecast; p Preliminary.

Exploration Highlights

Mineral exploration in Nova Scotia was focused primarily on gold with only a modest level of activity for base metals (lead and zinc), industrial minerals, and coal. Exploration in the province was carried out predominantly by the junior mining sector and private interests.

Exploration for gold was concentrated in the Meguma-hosted gold-bearing quartz veins in southern mainland Nova Scotia and PreCarboniferous metamorphic rocks of northern Cape Breton Island. Highlighting this activity was the continuation of a detailed feasibility study by Tangier Mining Corporation on the former Coxheath Gold Holdings Limited property at Tangier consisting of underground development work and test mining.

Placer Dome Canada Limited, in an option agreement with Orex Exploration Incorporated, began the initial phase of a detailed evaluation of the former Boston-Richardson gold property near Goldboro consisting of a preliminary diamond drilling program. Ellsin Resources Limited carried out additional work on the Lake Charlotte gold property during the year consisting of surface trenching and underground bulk sampling.

Lodestone Limited completed the second phase of a bulk sampling program on its MacMillan Flowage gold prospect east of Cheticamp, and Highland Range Minerals Limited initiated a detailed evaluation of a series of gold/base-metal showings in the Faribault Brook area east of Cheticamp consisting of a preliminary diamond drilling program.

During 1995, new mine development activity took place at three locations in Nova Scotia: Dufferin Resources Incorporated began underground development for gold at Dufferin Mines; Tangier Mining Incorporated reactivated a former underground gold operation at Tangier; and development of a new surface coal mine was initiated at Thorburn by Thorburn Mining Limited.

For 1996, the outlook is promising for new mining development in the province. A new surface coal mine, operated by Pioneer Coal Limited, has started production at Stellarton. Additional work is expected for new gold and gypsum operations and there should be continued interest in the recent discoveries of kaolinitic clays and silica sand in several lowland areas of the province.

Direct financial support for the mineral industry continued to be available through the final year (1995) of the Canada-Nova Scotia Cooperation Agreement on Mineral Development (CAMD) under two federally funded programs. The Mineral Investment Stimulation Program (MISP) is a federally funded and administered program to provide assistance to companies and individuals. The current program contributes up to 50% of the costs for qualifying projects to a maximum of $50 000 with a total of $485 000 available under the agreement. The Nova Scotia Prospectors Assistance Program (NSPAP) is a federally funded program administered by the

Nova Scotia Department of Natural Resources to provide direct financial assistance to qualified prospectors and explorationists. The program provides financial assistance of up to $5000 for qualified projects with a total of $640 000 available for grants through the agreement.

The existing tax credit system has been improved to help attract private-sector venture capital for mineral exploration and development. A personal income tax credit of up to $9000, or 30% of the first $30 000, is now available for investors in new share issues of eligible companies. This is up significantly from the previous tax credit of 25% of the first $10 000.

In addition, the government has introduced a new corporate income tax credit to assist small companies in accessing equity markets by lowering the cost of issuing shares to the public. The first $100 000 of costs associated with the preparation of a public offering is now eligible for a non-refundable tax credit of 35%.

5.4 NEW BRUNSWICK

Mineral Exploration Review

In 1995, New Brunswick exploration activity increased by 75% over 1994 figures, reaching a preliminary total of $17.5 million (**Table 7, Figure 18**). Although the number of claims recorded in 1995 was down 5% to 3779 (**Table 7, Figure 19**) from the 1994 total of 3980, there were 18 396 claims, 5 coal agreements (3904 claim equivalents), 2 potash leases (1753.3 claim equivalents), and 16 mining leases (776 claim equivalents) in effect at the end of the year, which represent a total claim equivalent of 24 866 (up 4% from 1994). Survey results indicate that approximately 36 562 m of drilling, representing a 12.5% increase over 1994, was conducted in New Brunswick during the year.

As in previous years, the majority of exploration was concentrated in the northern part of the province in and around the Bathurst-Miramichi camp. The bulk of the exploration expenditures (approximately 44%) in this part of the province were spent by Noranda Mining and Exploration Inc. The number of claims in effect was about 15 000, up 1000 over 1994. The number of new claims recorded in northern New Brunswick during 1995 was approximately 2400 compared to 2900 the year before. A significant amount of this new staking was in anticipation of the results of the airborne survey that was flown over the entire Bathurst camp as part of the EXTECH-II Program. Although most of the exploration continued to be focused on base metals in the Bathurst camp, other targets include porphyry-skarn copper deposits in the carbonate terrane west of the camp, precious metals in the Nigadoo River and Upsalquitch

TABLE 7. NEW BRUNSWICK MINERAL EXPLORATION STATISTICS, 1993-96

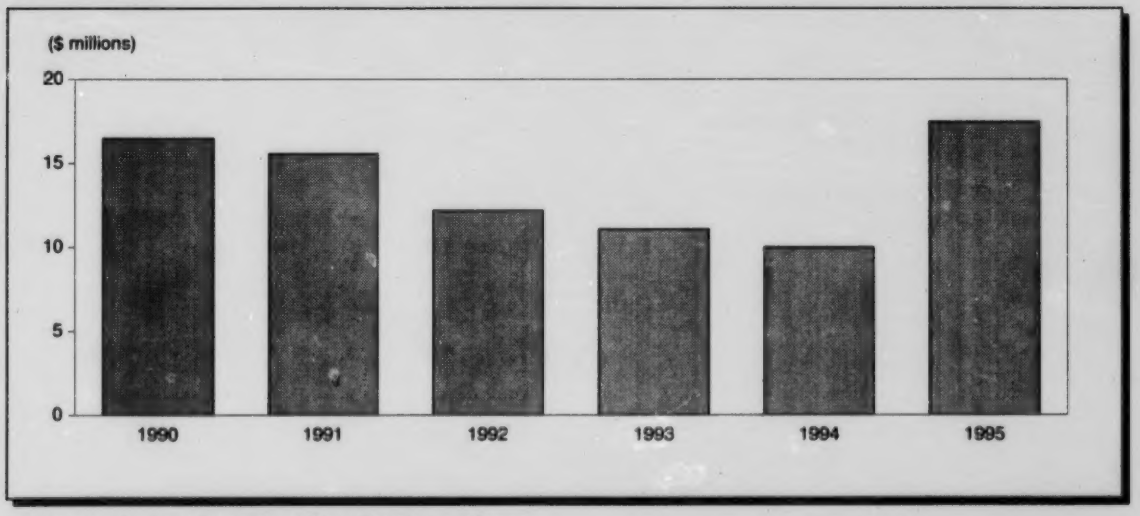
	1993	1994	1995	1996f
Exploration expenditures (general and mine-site) ($ millions[1])	11.1	10.0	17.5e	20.1
Mineral claims recorded (no.)	2 351	3 980	3 779	. .
Total claim equivalents in effect (no.)	22 453	23 859	24 866	. .

Source: New Brunswick Department of Natural Resources and Energy.
. . Not available; f Forecast.
e Preliminary survey results.
1 Current dollars, includes overhead expenses.

River areas, and copper-nickel deposits in the Goodwin Lake-Portage Brook intrusive belt that lies along the western boundary of the camp.

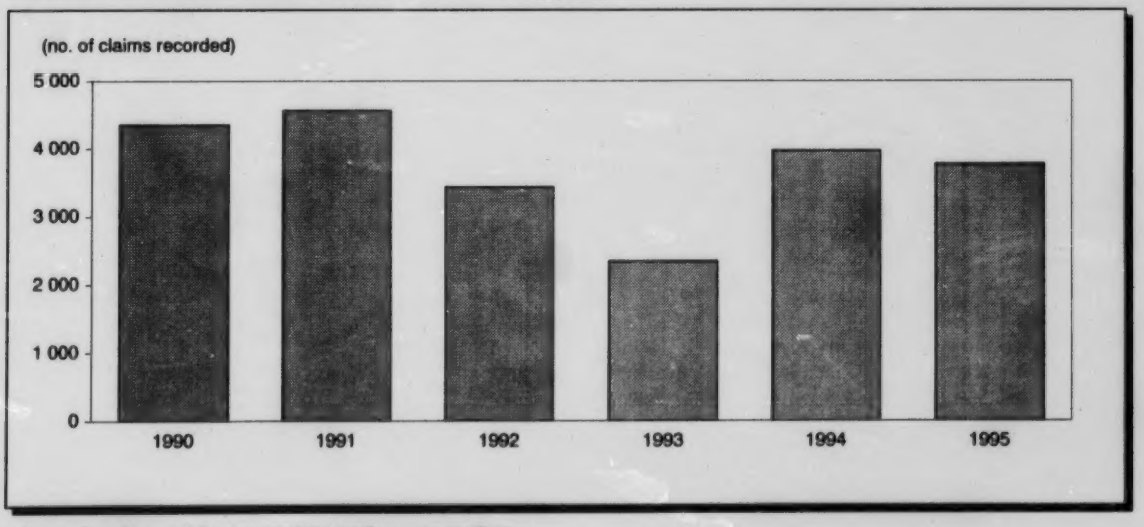
During 1995, the active major companies were Noranda Mining and Exploration Inc., BHP Minerals Canada Ltd., and Inmet Mining Corporation. Teck Exploration Ltd. held a significant number of claims in the Bathurst camp and acquired more in the latter part of the year. Other major companies that held ground but did not actively explore were Rio Algom Exploration Inc., Conwest Exploration Company Limited, Granges Inc., and Phelps Dodge Corp. of Canada Ltd.

Figure 18
Mineral Exploration Expenditures in New Brunswick, 1990-95



Source: New Brunswick Department of Natural Resources and Energy.
Note: 1995 exploration expenditure data are based on preliminary results from the federal-provincial survey of mining and exploration companies.

Figure 19
Mineral Claims Recorded in New Brunswick, 1990-95



Source: New Brunswick Department of Natural Resources and Energy.

Exploration in southern New Brunswick was focused on gold and base metals, but there was also interest in granite-related deposits, platinum, palladium and titanium. The number of claims staked in the south increased 30% to approximately 1300 in 1995, up from 1000 in 1994. The number of claims in effect remained the same at approximately 3000.

In order to provide stimulus to the exploration industry, the Province of New Brunswick, under a Canada-New Brunswick Cooperation Agreement on Economic Diversification, launched a major project that consisted of a 22 000-line-kilometre multiparameter helicopter survey (electromagnetics, magnetics, and radiometrics) over the entire Bathurst mining camp (about 3400 km^2). The survey was jointly managed by the New Brunswick Department of Natural Resources and Energy (Geological Surveys Branch) and the Geological Survey of Canada (GSC). Results of this survey will be released to the public in the summer of 1996; many companies and individuals are anxiously awaiting the data.

The EXTECH-II program, a multi-disciplinary geoscientific study of the Bathurst mining camp, aimed at improving the understanding of the geology of this important base-metal-rich area, continued into its second year, involving more than 28 geoscientists from the GSC and New Brunswick's Geological Surveys Branch. The overall objective of the program is to provide the mineral exploration industry with products and knowledge that will allow it to apply better techniques in the search for new deposits.

The Province of New Brunswick also continued its support of the prospector incentive program, the Mineral Exploration Stimulation Program (MESP), by approving 33 grants totalling $50 000 in 1995. Similar funding will be available in 1996.

For the second year, the Government of Canada and the Province of New Brunswick provided funding under the New Brunswick Exploration Assistance Program (NBEAP) to assist junior mining companies in the province in their quest for the discovery of new mineral deposits. For 1995, the NBEAP program allocated $400 000 to 27 applicants.

Development Highlights

In 1995, New Brunswick's estimated value of mineral production reached $1 001 963 865, representing an increase of approximately 16% over the final value of $862 044 372 for 1994. This increase can be attributed to both improved metal and potash prices and increased production in both the metals and potash sectors. The resumption of operations at Heath Steele Mines has had a major impact on the production of copper, lead and zinc.

Business decisions made in 1995 are expected to result in the development of major mineral properties in New Brunswick in 1996. First, in northern New Brunswick, East West Caribou Mining Limited has decided to resume production at the Caribou mine following favourable metallurgical testing and a positive feasibility study regarding the production of marketable lead and zinc concentrates. Production is slated to begin in the fourth quarter of 1996. In July of 1995, Breakwater Resources Ltd. drilled two holes into the Restigouche deposit to investigate the metallurgical properties of the ore. The company announced on September 5, 1995, that it had acquired the property from Marshall Minerals Corp. Mining of the 1.6-Mt Restigouche deposit is an integral part of the plan to re-open the Caribou mine. Ore from Restigouche will be mined initially by open pit and hauled by road to the Caribou mill.

In central New Brunswick, APOCAN Inc. has obtained regulatory approval for the re-opening of its Lake George antimony mine. The decision to re-open the mine followed the dramatic rise in the price of antimony in 1994. The company has completed dewatering of the mine and production is expected to begin in 1996.

In the southwestern part of the province, ADEX Mining Corporation has acquired ownership of the Mount Pleasant tin-indium-zinc-bismuth-tungsten deposit from Piskahegan Resources Inc. Metallurgical testing is continuing on the extraction of indium using bioleach technology. Following the positive results of this test work, it is expected that production of indium could

begin in the fourth quarter of 1996. Development leading to the commencement of tin mining is scheduled for 1997.

Outlook for 1996

New Brunswick will be looking forward to another banner exploration year if all forecasts come to fruition. Exploration expenditure surveys point to approximately $20.1 million being spent in 1996. As indicated earlier, many companies and individual prospectors were anxiously awaiting the airborne geophysical data release for the Bathurst mining camp scheduled for July of 1996.

Although the majority of exploration expenditures in New Brunswick are in support of base-metal exploration, as a result of an agreement between the Minister of State for Mines and Energy and Saskatchewan-based International Minerals & Chemical (Canada) Global Limited [IMC Canada], exploration on the Millstream potash deposit will provide a diversified focus. IMC Canada has stated its willingness to commit $575 000 to a three-year exploration program, which is to begin with a geotechnical reassessment of the deposit from data collected over the last decade. The second phase will include a three-dimensional seismic survey; a final geological assessment and feasibility study will conclude the program. If the reassessment and feasibility study yield positive results, IMC will propose a development and mining strategy for the Millstream deposit.

Coupling the planned exploration expenditures of $20.1 million with the forecast $24.4 million expenditure figure for major mineral developments, New Brunswick looks forward to a bright year in 1996.

5.5 QUÉBEC

Exploration Expenditures

Preliminary data indicate that exploration expenditures in Québec totalled $144.8 million in 1995, an increase of 6% over the 1994 level ($136.6 million), making this the third consecutive year-over-year increase. Junior spending also rose to $42 million in 1995 from $36 million in 1994. Off-property exploration expenditures were up 4% to $118 million in 1995 compared to $113 million in 1994, while on-property exploration increased 15% to $27 million in 1995 from $23 million in 1994 (**Table 8**).

TABLE 8. QUÉBEC, FLOW-THROUGH SHARE FINANCING AND EXPLORATION EXPENDITURES, 1992-96

	1992	1993	1994	1995P	1996•
			($ millions)		
Value of flow-through share issues	13.6	27.4	18.4	20.1	. .
Exploration expenditures	101.5	111.8	136.6	144.8	184.2
Off-property	83.6	91.9	113.5	118.2	160.2
On-property	17.9	19.9	23.1	26.6	24.0

Source: Service de la recherche en économie minérale, Ministère des Ressources naturelles du Québec.
. . Not available; • Estimates derived from the survey conducted in the fall of 1995; P Preliminary data.

Exploration highlights in Québec in 1995 were as follows:

- Mineral exploration was influenced by two key events: the Near North Mineral Exploration Program and the discovery of nickel at Voisey's Bay, Labrador.
- The effects of the Voisey's Bay find are being felt in the North Shore and New Québec regions, and particularly in the Québec-Labrador Trough and George River. Increased interest by companies and prospectors in the Grenville anorthositic complexes was also observed. Copper and nickel are the main metals sought.
- A number of companies, both large and small, have taken an interest in the other regions covered by the Near North Mineral Exploration Program (James Bay, Lower North Shore). Particular attention is being paid to the James Bay volcanic belts. The results announced to date indicate the strong gold-bearing potential of these structures.
- A substantial proportion of the base- and precious-metal exploration effort was concentrated near existing or former mines. The search for metals was most intense in the Fénélon-Jérémie region west of Matagami, the Casa Berardi-Laberge region north of LaSarre, and the Lebel-sur-Quévillon region.
- In the Appalachians, the volcanic zones (volcanic belts of Clinton and Saint-Anselme and volcanic complexes of Weedon and Ascot) continue to attract explorers searching for gold and base metals.
- Exploration for diamonds continued in 1995. Other major exploration work is being carried out in Témiscamingue, James Bay and the Montréal-Saint-Hilaire-Granby corridor.
- Industrial minerals (apatite, silica, kaolinite, olivine) and construction materials (granite, limestone, slate) continue to be the focus of significant prospecting and exploration activity, particularly in southern Québec.

Flow-Through Share Financing

According to preliminary data compiled by the Service de la recherche en économie minérale (SREM), public financing of the mining industry in Québec totalled $59.3 million in 1995. Since flow-through share financing accounted for $20.1 million, the remaining $39.2 million of public financing was raised by means of other types of stock issues (**Table 8**).

In 1995, three factors stimulated demand for junior stocks: a general round of interest rate cuts, the recovery of Canadian stock markets, and a significant increase in the price of gold beginning in November. Since these events occurred during the last two months, there was not enough time to generate widespread interest in flow-through shares, although demand for these shares was nonetheless firm at year-end.

In 1996, continued economic growth and relatively stable raw materials prices should help sustain investor interest in cyclical stocks, such as those in the mining sector. Because mining companies have increased their equity significantly since 1993 and profits have kept pace, their external financing needs are lower.

Hence, in 1996, the level of public financing of the Québec mining industry should be similar to the 1995 level. Financial market conditions may prove favourable to small cap stocks. Junior company stocks should benefit considerably as a result, making it easier for them to raise capital. In addition, continuation for most of the year of the favourable economic situation that prevailed in late 1995 (interest rate cuts, an increase in the price of gold, inflation under control) should enable the volume of financing to attain levels similar to those recorded in 1993 ($27.4 million).

Other Statistics on Exploration

The number of metres drilled by diamond drilling companies and the number of claims recorded are two other useful indicators of exploration activity. Diamond drilling increased in 1995 while the number of recorded claims decreased.

According to preliminary data, diamond drilling in 1995 totalled 1 018 039 m, up from 986 103 m in 1994, an increase of 3.2%. For the first quarter of 1996, the number of metres drilled was 337 380, an increase of 11% over the first quarter of 1995.

There were 15 984 claims recorded in 1995, a decrease of 17% from 1994.

Tax Measures for Flow-Through Share Financing

In Québec, the tax benefits associated with the flow-through share regime are broken down as follows:

- A 100% tax deduction for exploration expenses defined as "Canadian exploration expenses," for the purposes of both federal and Québec income taxes.

- For Québec income taxes, the taxpayer is entitled to an additional 25% for exploration expenses incurred in Québec; if these expenses are surface exploration expenses, the taxpayer is entitled to another additional deduction of 50% on these expenses (i.e., a deduction totalling 175% of the amount of the expense). The corporation may also renounce to individuals flow-through share issue expenses up to 15% of the proceeds of the issue in the proportion of expenses incurred in Québec; this portion of the issue expenses is therefore 100% deductible in the year, whereas the other issue expenses must be spread out over five years. For the proportion of expenses incurred in Québec, the taxpayer is also exempt from the capital gains tax on the difference between the cost of acquiring the shares and their base price, which is deemed to be nil for tax purposes.

The two levels of government assume up to 72.73% of the cost of exploration expenditures in Québec financed with flow-through shares when the expenses are eligible for a Québec deduction totalling 175% (**Table 9**). In the May 9, 1996 budget, the Québec Minister of Finance announced an extension of the program for another two years, i.e., until December 31, 1998. It was also announced that the 60-day period for incurring exploration expenses eligible for a tax deduction by an individual in the year of financing would be extended to one year.

Other Mining Exploration Incentives

In 1995, the Québec Department of Natural Resources managed four financial assistance programs for prospecting and exploration. The first two were:

- the Program of Financial Assistance for Prospecting in Eastern Québec (funded 60% by the federal government and 40% by the Québec government); and

- Component II of the Special Assistance Program for the Mining Sector of the Chapais-Chibougamau Region (funded 80% by the federal government and 20% by the Québec government).

Some $1.25 million was spent to implement these two programs in 1995/96. These programs, which ended on March 31, 1996, are part of the Canada-Québec Subsidiary Agreement on the Economic Development of the Regions of Québec. The other two programs are as follows:

- Component III (Assistance for Prospecting and Mining Exploration) of Program I (Geological and Mining Exploration) of the Canada-Québec Subsidiary Agreement on Mineral Development (SAMD) (funded 75% by the federal government and 25% by the Québec government); and

TABLE 9. QUÉBEC, $1000 FLOW-THROUGH SHARE INVESTMENT FOR SURFACE EXPLORATION[1]

Taxable Income	Marginal Tax Rate			Tax Savings			Net Investment Cost $1000 - (1+2)	After-Tax Break-Even Point[2]
	Federal	Québec	Total	Federal (1)	Québec (2)	Total (1+2)		
		(%)			($)		($)	($)
$40 000	22.49	24.61	47.10	225	431	656	344	414
$50 000	22.49	25.68	48.17	225	449	674	326	392
$60 000	25.09	26.40	51.49	251	462	713	287	354
$62 195 and over	26.54	26.40	52.94	265	462	727	273	341

Source: Ministère des Ressources naturelles du Québec.
Notes: Flow-through shares for surface exploration generate a deduction of 175% at the provincial level and 100% at the federal level. The table reflects income tax provisions applicable for the 1995 calendar year for a Québec taxpayer who is an individual and who is not subject to the minimum alternative tax. Marginal tax rates take into account provincial and federal surtaxes, the Québec tax reduction (2% of the amount over $10 000 of tax payable net of non-refundable tax credits) as well as a federal basic non-refundable credit of $1098 and a provincial basic non-refundable tax credit of $1180. Issue expenses are not taken into account.

1 New issues often comprise flow-through shares and common shares sold as units. In such cases, the tax deduction will be proportionate to the number of flow-through shares included in each unit. 2 The break-even point takes into account current income tax provisions relating to capital gains and the reduction available in Québec by means of the special account that shelters the deemed capital gain from taxation that excludes the cost of flow-through shares.

- the Near North Mineral Exploration Program (funded 100% by Québec), which was launched in 1994 and is aimed at stimulating exploration in the James Bay and North Shore territories.

Expenditures associated with Component III of Program I of the SAMD totalled $1.6 million in 1995/96. For the Near North Mineral Exploration Program, total assistance of $1.2 million was provided to 17 projects in 1995/96.

In the May 1995 budget speech, the government announced that a new tax credit would become available under the *Mining Duties Act*. This credit will apply to certain types of capital outlays associated with bringing a deposit into production that do not qualify for the refundable tax credit for losses which is currently allowed under this act. By issuing eligible shares, small and medium-sized mining companies that have a place of business in Québec and less than $50 million in assets or less than $40 million in equity will form financial partnerships with the institutions designated for the application of this tax measure. This measure will be in effect for five years, until the credits total $9 million. The new tax credit could generate investments of at least $75 million over five years.

The Québec Department of Natural Resources is continuing with the implementation of SIGÉOM, an integrated geographically referenced geological and mining information system that greatly facilitates access to and processing of available geoscientific data for the mining industry. The system is currently available in five of the eight offices of the Québec Department of Natural Resources. There are plans to install SIGÉOM facilities in the remaining three offices during 1996.

5.6 ONTARIO

Gold was the primary commodity sought during 1995. However, substantial increases in base-metal prices, especially nickel, increased exploration for these metals in Ontario. The search for diamonds continued at an accelerated pace over 1994 with exploration concentrated in the Cobalt, Wawa and James Bay Lowland areas of the province.

General and mine-site exploration expenditures are forecast at $159 million in 1996, up from $136 million in 1995 (preliminary) and $113 million in 1994. In 1994, 30% of general and mine-site field exploration dollars were spent on base-metal exploration and 68% were spent on precious-metal exploration. In 1993, 41% were spent on base metals and 55% on precious metals.

Senior mining companies' share of general and mine-site exploration expenditures declined to 66% in 1996 from 75% in 1995 and 84% in 1994. Junior mining companies were responsible for 34% of the $159 million forecast for exploration expenditures in 1996, an increase from 25% in 1995. Seniors were responsible for $105 million in expenditures and juniors accounted for $54 million.

Mine-site development expenditures for 1996 are forecast at $214 million compared to preliminary estimates of $240 million for 1995 and $220 million in 1994. These data include overhead expenditures. In 1994, 67% of mine-site development field expenditures were on precious-metal projects and 22% were on base-metal projects. This compares to 53% and 36%, respectively, in 1993.

Total expenditures for both mineral exploration and mine-site development in Ontario are forecast to be $373 million in 1996. This is comparable to the 1995 preliminary figure of $376 million, and is a 12% increase over 1994 expenditures of $333 million.

There were 164 934 active claim units in Ontario at the end of 1995, up 8% from the 153 040 claims reported at the end of 1994. During 1995, a reported $21.2 million worth of exploration work was recorded for assessment credits. Half of this amount was spent on diamond drilling.

New Mines

Falconbridge Limited brought the Sudbury area Craig nickel-copper mine into full production in August 1995 at a cost of $265 million.

River Gold Mines Ltd. is in production at its Eagle River gold mine, west of Wawa. River Gold expects production to reach 45 000 ounces (oz) of gold in 1996.

Development Stage Projects

Hemlo Gold Mines Inc. and partner Teddy Bear Valley Mines, Limited are spending $55 million to put their Holloway gold property, located northeast of Kirkland Lake, into production by late summer 1996. The planned production rate is about 100 000 ounces of gold per year with reserves for 13 years.

Placer Dome Inc. and 32% joint-venture partner TVX Gold Inc. announced on February 22, 1996, that their Musselwhite property, located 130 km north of Pickle Lake, will be put into production by the second quarter of 1997 at a cost of US$190 million. Current proven and probable reserves are 9.8 Mt averaging 5.6 grams per tonne of gold. The mine is forecast to produce 200 000 oz annually for over 10 years at an average cash production cost of US$200/oz.

Mine Expansion

Placer Dome Canada Limited began work on a $70 million "Depth Development Program" at its Campbell gold mine near Red Lake. The target date for completion is January 1999.

Kinross Gold Corporation will spend $35 million by the end of 1996 on a new shaft and mill expansion program at its Hoyle Pond gold mine near Timmins.

Inmet Mining Corporation will spend $26.3 million to access and develop the Pick Lake ore zone from its Winston Lake mine north of Schreiber. The additional reserve will extend the lifespan of the operation to the year 2002.

Inco Limited plans to put the McCreedy East project, located west of Sudbury, into initial production by late 1996 and into full production by 1999. The $194 million project is expected to produce 2721 t/d of ore, or 10 200 t of nickel and 35 150 t of copper annually for 17 years.

Advanced Exploration

Inco Limited began a $72 million pre-development program on the Sudbury area Victor nickel-copper deposit that will culminate with a feasibility study in 1999.

Sudbury Contact Mines Limited and partner Agnico-Eagle Mines Limited plan to spend $25 million on shaft sinking, underground exploration, development and diamond drilling in 1996 and 1997 on their Victoria Creek gold property northeast of Kirkland Lake.

Outokumpu Mines Ltd. began a $20 million underground exploration program on its Montcalm base-metal deposit northwest of Timmins.

Madsen Gold Corp. is continuing its $8 million capital program to refurbish and explore the Madsen gold mine site south of Red Lake.

Exploration

Partners Pangea Goldfields Inc., Homestake Canada Inc. and Cominco Ltd. are carrying out a feasibility study on the Fenn-Gib gold property near Matheson. A pre-feasibility study indicated that the deposit could be mined initially as an open-pit operation followed by underground development.

Nuinsco Resources Limited and partner Diamond Fields Resources Inc. plan to spend $3.5 million continuing exploration work on their 65 000-acre holding in the Rainy River area.

Cambior inc. optioned 51% of Nuinsco Resources' Cameron Lake gold deposit near Nestor Falls and will spend $1.5 million in 1996 to upgrade reserves.

Black Hawk Mining Inc. is conducting work on five mineralized zones at the Vogel gold property in Hoyle Township, northeast of Timmins. The total resource outlined is reported to be nearly 7.78 million grams of gold.

Joint-venture partners Queenston Mining Inc. and Franco-Nevada Mining Corporation Limited are acquiring property holdings along a 27-km stretch of the Kirkland Lake-Larder Lake Break. A $3.5 million exploration budget was approved and drilling is planned on the properties along the "Break."

KWG Resources Inc. and Spider Resources Inc. are examining kimberlites and other diamondiferous host pipes at the Kyle Lake, Spider and MacFadyen sites in the James Bay Lowlands. Ashton Mining of Canada Inc. is also evaluating the properties for their diamond potential. KWG and Spider will continue their exploration efforts.

Canmine Resources Corporation is exploring its Werner Lake cobalt-copper-gold property 80 km southwest of Red Lake. The company plans to complete 12 000 m of drilling by the spring of 1996 and to spend $1 million on a winter drill program to delineate mineral reserves. Material from the old Werner Lake cobalt mine has been shipped by rail to Sudbury for processing. The company plans to erect a pilot portable production mill at the mine site.

Mineral Exploration Incentives Programs

The Ontario Prospectors Assistance Program (OPAP) provides financial assistance to qualified individuals and companies involved in mineral exploration in Ontario. The grants provide 100% of approved eligible expenses to a maximum of $10 000 per individual per year. The OPAP budget allocated for 1996 is $2 million. A total of 215 individuals from 356 applicants were approved for OPAP assistance in 1996. In 1995, 233 individuals were approved for assistance from 396 applicants.

The Ontario Mineral Incentives Program was discontinued upon completion of the 1995/96 program. Mineral exploration incentive programs under the Northern Ontario Heritage Fund were also discontinued.

Tax Treatment of Flow-Through Shares

The federal budget of March 6, 1996, announced a number of changes to the flow-through share regime. These include: (i) allowing more time for companies to undertake resource expenditures related to flow-through share financing; and (ii) excluding expenditures related to the cost of mining properties from Canadian Development Expenses (CDE), which can be renounced to subscribers. The Ontario Budget of May 7, 1996, confirmed Ontario's legislation will be amended to accommodate the proposed changes to the federal rules.

5.7 MANITOBA

Commentary

Mineral exploration expenditures during 1995 are estimated at $36 million compared to $40 million in 1994. Surface diamond drilling in 1995 is estimated at 150 056 m compared to 157 779 m in 1994. The total area of claims and exploration permits recorded in Manitoba during 1995 was 670 316 ha. The total area of mineral dispositions in good standing at the end of 1995 was 2 868 914 ha.

Inco Limited continued its program of delineation drilling at the Pipe Deep project south of Thompson. When the discovery was initially announced in 1994, the Pipe Deep structure was reported to contain 3.63 Mt grading 2.32% nickel with copper, cobalt and PGE (platinum group elements) values. Drilling of the Pipe 1 structure has been completed. Drilling of the Pipe 2 structure at depth was carried out in 1995 and is expected to be completed in 1996.

Falconbridge Limited continued to focus exploration in the southern extension of the Thompson Nickel Belt, specifically at William Lake where favourable Precambrian rocks are covered by over 100 m of younger Palaeozoic carbonate rocks. Diamond drilling in the area during the 1991-95 period discovered six nickel prospects over a strike length of 20 km. Drill intersects over the most promising prospect gave assay results of up to 3.9% nickel over 3.6 m.

During 1994, Hudson Bay Exploration and Development Co. Ltd. discovered two new zones of copper and zinc mineralization at the Callinan mine near Flin Flon. These new zones occur significantly deeper but in the same sequence of rocks that hosts the current Callinan mining operations. Deep drilling of this new discovery continued in 1995.

Mining and Exploration Incentives Programs

Several tax initiatives and exploration incentive programs introduced by the Government of Manitoba in the last few years have repositioned Manitoba from having the highest combined income and mining tax rates to among the lowest in Canada for new mines.

Investment Credit

A new investment credit of 7% of investments, made between April 21, 1994 and December 31, 2003, in new mines and processing facilities in Manitoba, or major expansions of existing mines or processing facilities, will be available. The new credit is deductible to a maximum of 30% of mining tax payable in a given year and can be carried forward for use in future years.

Processing Allowance

The processing allowance, which may be deducted from mining taxes, has been increased from 10% to 20% of the original cost of processing assets acquired for new mines or major expansions to existing facilities.

Mining Tax Holiday For New Mines

For new mines established after January 1, 1993, a mining tax holiday is in place. Qualifying mining operators are not required to pay the mining tax until their profits for mining tax purposes equal their capital outlays in opening the new mine. At the end of the tax holiday, operators will inherit the undepreciated balance of book assets.

Mining Tax Exploration Incentive

Mining companies who increase their exploration activities in search of new mines in Manitoba are entitled to a deduction equal to 150% of exploration expenditures. Eligible exploration expenditures in a given year must exceed the average of expenditures in the previous three years.

Sales Tax

Since April 1, 1995, electricity used for mining and manufacturing has been sales tax exempt.

Geophysical survey and exploration equipment (other than drill rigs) designed and used solely for prospecting or minerals exploration and that is purchased in or brought into Manitoba on a

temporary basis will be exempt from sales tax. This measure will be effective commencing March 31, 1996, for geophysical survey aircraft, and July 1, 1996, for all other geophysical and exploration equipment.

Prototype equipment used to research and develop new mining technologies that are purchased in or brought into Manitoba on a temporary basis will be exempt from sales tax after April 2, 1996.

Corporation Capital Tax

For corporation capital tax purposes, unclaimed federal exploration and development expenses will now be deductible for all mining companies. This measure will be in effect for taxation years ending after December 31, 1995.

Fuel Tax

An exemption from motive fuel tax will be allowed on diesel fuel for use exclusively off-road for mineral exploration. This exemption came into effect on April 2, 1996.

Prospectors Assistance Program

The government will reimburse 50% of prospecting expenditures of qualifying self-employed prospectors to a maximum annual grant of $7500 on pre-approved projects. In fiscal year 1995/96, 30 applications for grants were received of which 26 were approved. Twenty projects were completed, resulting in the payment of $86 500 in provincial funding.

Mineral Exploration Assistance Program

The Mineral Exploration Assistance Program (MEAP) was established in the fall of 1995 and provides financial assistance to companies exploring for minerals in Manitoba. Funding of $10 million has been approved for MEAP. MEAP offered $1 million to start the program off with an October 1, 1995 deadline for applications. Three million dollars has been allocated to each of the next three fiscal years. MEAP's first offering of $3 million was held January 2, 1996, with the next offerings scheduled for November 15, 1996 and November 17, 1997.

The General Program offers assistance of up to 25% of approved eligible expenses to a maximum of $300 000 per recipient per fiscal year.

The Target Area portion of the program offers assistance of up to 35% of approved eligible expenses to a maximum of $400 000 per recipient per fiscal year.

Sustainable Development Mineral Strategy

The government of Manitoba has adopted the principles of sustainable development as a cornerstone of its economic and environmental agenda. In response to the commitment, a white paper outlining Manitoba's framework for implementing sustainable development will be released in the summer of 1996. The white paper and resulting enabling legislation will undergo a public consultation and evaluation in the fall of 1996. One component of the provincial sustainable development commitment is the mineral strategy. An action plan is currently being prepared and the implementation of the strategy is being prioritized to accommodate the strategic objectives of the Whitehorse Mining Initiative.

Issues related to land access, environmental permitting, security of tenure and the need to increase mineral exploration to sustain the mining industry in Manitoba and Canada continue to rank at the top of the mining industry's concerns. Manitoba has been successful at resolving the Manitoba Lowlands National Park and the Churchill National Park without compromising any valid mineral dispositions. Currently, a provincial parks systems plan is being developed.

Manitoba will honour all mineral dispositions and at the same time provide improved protection for critical habitat that fulfils its endangered spaces mandate.

A new land use policy was enacted as a regulation under the *Planning Act* in September 1994. The policy provides for regulatory control of land use allocations and offers comprehensive legal protection for mineral resources and mining rights. The policy significantly improves security of tenure and helps improve the mining industry's ability to access lands with mineral potential.

5.8 SASKATCHEWAN

The annual survey of mineral exploration expenditures carried out by resident geologists estimated expenditures at $33 million in 1996 compared to $29 million in 1995. These figures exclude uranium test mining costs estimated at $60 million and $29 million respectively in those two years. Exploration levels in 1995 for uranium and for advanced gold exploration activity were somewhat higher than anticipated. This upswing, which began in 1993, is expected to continue through 1996 (**Table 10**).

The total number of dispositions in good standing at the end of 1995 was 5421 (covering 4.2 million ha) compared to 8531 (covering 6.1 million ha) at the end of 1994. In 1995, 436 new dispositions were recorded covering 537 858 ha, a decrease of 81% in the number of new dispositions over the previous year. The decline in land covered by claims in good standing was primarily due to the dropping of land acquired for diamond exploration.

TABLE 10. SASKATCHEWAN EXPLORATION EXPENDITURES, 1987-96

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996•
	($ millions)									
Precious metals	29	42	20	11	5	6	2	4	8	8
Base metals	3	6	7	7	6	4	4	4	4	4
Uranium	18	20	21	12	10	8	7	11	13	15
Other	–	–	2	2	3	4	11	10	4	6
Total	50	68	50	32	24	22	24	29	29	33

Source: Resident Geologists Survey, Saskatchewan Department of Energy and Mines.
– Nil; • Estimated.
Note: "Other" includes some industrial mineral activity, but predominantly diamond exploration.

Uranium

Uranium exploration activity, while on the rise in response to improving uranium spot prices, continues to be constrained by an excellent local reserve base and global inventory surplus. Some 10 companies continued to explore in the Athabasca Basin in joint ventures and, while discovery potential remains high, no significant new finds were reported in 1995.

In March 1995, Cogema announced the decision to proceed with the $250 million McClean Lake project planned for start-up in mid-1997. Mining of the JEB pit began and will be completed by 1997, after which the pit is scheduled to be used as a tailings facility. Cogema and partners hope to develop the nearby Midwest orebody in conjunction with the deposits on the McClean Lake property, and in August submitted a revised Environmental Impact Statement (EIS) and mining plan to the federal-provincial uranium panel for review. Submissions were also made to the panel for the development of mines at Cigar Lake and McArthur River in October and December, respectively. If approved, these mines are scheduled for production in 1999. McArthur River will provide feed for the Key Lake mill with the depletion of the Deilmann

stockpiled ore whereas, at the $410 million Cigar Lake mine, production will be processed through an expanded milling facility at McClean Lake. Underground exploration at McArthur River in 1995 led to an upward revision of geological reserves to 160 000 t of uranium (416 million lb U_3O_8) grading 12.7% uranium (15% U_3O_8), making this Saskatchewan's largest and richest uranium deposit.

Gold

Gold, like uranium, is in a mining development phase. A Cameco Corporation-operated joint venture officially opened the Contact Lake mine in February 1995. The mine, in La Ronge Provincial Park, has scheduled annual production of 65 000 oz; however, 1995 production fell short due to grade control problems and resulted in a 28% reduction in the estimated gold reserves and resources. Claude Resources Inc., now Saskatchewan's largest primary gold producer, continued to operate the Seabee mine successfully, and Waddy Lake Resources Inc. announced plans to have the Komis mine in the La Ronge Gold Belt in production in early 1996. A mid-1996 start-up is now more likely for this 45 000-oz/y mine.

While these mines illustrate that there are gold discoveries to be made in the province, exploration was undertaken by less than 10 companies (mostly in the La Ronge and Glennie domains). Greater Lenora Resources Corp. continued drilling and completed a positive final feasibility study, released in October, on the Box and Athona properties. A combined mining reserve of 16.6 Mt grading 1.7 g/t (0.05 oz/short ton) gold was identified. The project proposal called for commissioning in mid-1997 of a 6000-t/d mine producing 100 000 oz of gold annually with capital and operating costs at $66.1 million and US$212/oz respectively. Gravity and flotation circuits in combination will allow low-cost processing. A more recent assessment of reserves announced in May 1996 called for a downgrading in the magnitude and categorization of reserves due to the erratic distribution of gold in the deposits. However, the overall resource defined by available drill data remained unchanged.

Kristo Gold Inc., following the completion of a pilot plant test, proposed the reprocessing of 1.1 Mt of tailings from the historic Anglo-Rouyn copper-gold producer. Total *in situ* reserves were reported at some 26 000 oz of gold, 93 000 oz of silver, and 2400 t of copper. The project has a positive environmental spin-off, as it reprocesses acid tailings and redeposits them in the underground workings and the open pit. The mine site lies in Lac La Ronge Provincial Park.

In the Flin Flon area, Claude Resources Inc. initiated a program, based on an option agreement with Cameco Corporation and Husky Oil Ltd., to explore and develop the Amisk/Laurel Lake joint-venture gold property. Claude will spend $2.5 million to earn a 35% working interest. Laurel Lake, interpreted as an epithermal gold prospect, has been evaluated underground and has estimated geological reserves of 426 400 t grading 11.3 g/t (0.33 oz/short ton) gold.

Base Metals

In June 1995, Hudson Bay Mining and Smelting Co. Limited announced the discovery of the Konuto Lake copper deposit southwest of Flin Flon. The deposit, found by the company's SPECTRUM airborne EM system, has estimated reserves reported at 1.44 Mt grading 6% copper and 2.5 g/t gold (undiluted). A 1000-t/d underground mine could be in operation by late 1997, with ore being treated at the Flin Flon mill. An EIS was submitted in November 1995 and project approval was received in March 1996.

Grassroots base-metal exploration programs (volcanogenic massive sulphides (VMS)) were also ongoing in the Glennie and Kisseynew domains and Subphanerozoic area, the Western Craton (nickel-copper in the Tantato Domain and Clearwater anorthosite complexes), and the La Ronge Domain (nickel-copper in ultramafic-mafic intrusives). Noranda Exploration and Development Ltd.'s promising sediment-hosted copper play in the Wollaston Domain was on hold, although survey mapping continued in the area to evaluate new discoveries.

Diamonds

The land under disposition for diamond exploration was substantially reduced from a peak of over 4 million ha in 1994 to around 2.5 million ha at the end of 1995. Expenditures also declined in 1995 by over 50%; however, it appears that this trend will reverse in 1996 (see "other" in **Table 10**). Projects involving bulk sampling were confined to the Fort à la Corne (FALC) kimberlite field and its northwest extension in the Candle-Whiteswan lakes area. The kimberlite bodies discovered to date have proved, in most cases, to be diamondiferous. While they are low grade, they are typically up to several hundred million tonnes in size and open-pit mineable.

Kensington Resources Ltd. is acquiring a 25% participating interest in the FALC project from a Uranerz Exploration and Mining Limited-Cameco Corporation-Monopros Limited joint venture for $3.4 million in exploration over three years. In 1995, eight mini-bulk, large-diameter reverse circulation air blast holes were drilled on separate kimberlite bodies, four of which were known to be diamondiferous. Exploration to date has located 44 kimberlites in 139 holes. Of these, 24 kimberlites have been found to be macrodiamond bearing (>1 mm). The highest-grade kimberlite, identified from the mini-bulk sample processing, yielded 7.7 ct per 100 t.

Kennecott Canada Inc. can acquire a 60% interest in the Candle Lake project of War Eagle Mining Company Inc. and Great Western Gold by spending $8 million over five years. The 1995 program completed nine holes on kimberlite 30C, previously thought to be four discrete bodies. A 1345-kg sample from the holes yielded 181 diamonds of which 32 were macrodiamonds (>0.5 mm). DDH 95-1, the best hole, yielded 60 diamonds of which 10 were macrodiamonds from 132 kg of sample. The body has an inferred potential of 63.5 Mt.

Mining Lands Initiatives

The Mineral Disposition Regulations, 1986 were amended to include a *force majeure* clause that allows disposition holders to obtain relief from assessment work requirements under exceptional circumstances. This action was prompted by a severe forest fire season, which prevented disposition holders from accessing their claims.

The Department undertook an assessment of all Crown reserves and several were re-opened for staking. Industry was consulted about the process and recommended the existing method of land posting.

In consultation with industry, a review of *The Mineral Disposition Regulations, 1986* was initiated. In addition to addressing a number of administrative issues, the review will examine several issues including map staking, disposition size, the length of time that dispositions can be held, the collection of data in a digital format, and fee structure.

Digital claim maps were produced with the objective of establishing an operational system in 1996.

5.9 ALBERTA

During 1995, the number of active metallic and industrial mineral permits decreased to 1400 from the all-time peak of 4430 in December 1994. The area under these exploration agreements decreased from 38.6 million ha to 10.8 million ha, a situation seen as a normal reduction after an exploration rush such as Alberta experienced in the combined diamond and gold rushes of 1992 and 1993.

Diamond exploration continued to be the focus in two areas of the province: Hinton and Peace River. In the Hinton area, New Claymore Resources Ltd. conducted both ground and airborne

geophysical surveys and, through a program of indicator mineral sampling, recovered a number of microdiamonds. Kennecott Canada Inc. has optioned a block of permits from New Claymore and Rich Resource Investments and will be conducting field work and drilling this year. In the Peace River area, TUL Petroleums Ltd. conducted a regional indicator mineral sampling program on its properties and has identified a suspected diatreme.

Exploration continued in 1995 on the large base- and precious-metal anomalies in the Birch Mountain and Fort MacKay areas of northeastern Alberta. Tintina Mines Ltd. and Birch Mountain Resources Ltd. both conducted extensive exploration programs on their large land holdings in this area, including geochemical and mineral sampling surveys. Birch Mountain Resources also drilled a number of holes, taking 1200 m of core. Further work is planned by both companies for the 1996 field season.

The Clear Hills iron deposit also attracted some interest in 1995. This deposit last received exploration attention in the 1960s when one billion t of 35% grade oolitic iron were identified. Marum Resources Inc. conducted sampling of anomalous gold trends in the deposit in 1995 and is re-evaluating the economics of the deposit.

The overall exploration outlook in Alberta is very positive. The assessment work reported increased from almost nothing in the early 1990s to $6.6 million in 1995 and, by the end of May 1996, had already reached $6.4 million.

Flow-through shares in 1995 on the Alberta Stock Exchange totalled $59.2 million, which is a 2.8% decrease from the 1994 level of $60.9 million. Most of the funds raised were for the oil and gas industry. The relatively high level of flow-through share activity from 1993 to 1995 is attributable to changes to the *Income Tax Act* in December 1992.

5.10 BRITISH COLUMBIA

1995 Statistical Overview

Exploration expenditures in British Columbia (B.C.) for 1995 are estimated at $83.5 million, on par with the $85 million spent in the province in 1994. Mineral claim units recorded totalled 31 700 in 1995, somewhat higher than the 29 245 units recorded in 1994. Free miner certificates issued totalled 4866 in 1995 versus 4774 in 1994.

In 1995, 214 companies reported expenditures, with 49 of these spending half a million dollars or more. Twenty-four companies reported spending more than $1 million in B.C. last year. The average expenditure is estimated at $390 000.

According to Ministry regional offices, approximately 13% of exploration expenditures were at mine sites and 47% were on advanced projects including bulk sampling, environmental studies, and reclamation programs. An estimated 40% was spent on less advanced and grassroots exploration programs.

Over 90% of all expenditures were for precious and base metals.

Exploration activity on industrial mineral and coal prospects increased during 1995.

Project Development Highlights

In January 1995, the Eskay Creek (Prime Resources Group Inc.) silver-gold mine north of Stewart began shipments of high-grade ore to smelters in Japan and Québec. Eskay is currently the province's largest gold producer at over 6 million grams of gold per year, employing 105 people. The mine is one of the largest producers of silver in the world and shipped over 300 000 kg of silver during the year. Successful drilling during the year to extend the orebody

will continue in 1996. The success of Eskay Creek continues to spur additional exploration and development activity in and around the region.

In 1995, Kinross Gold Corporation began production at its Quesnel River gold project, 70 km southeast of Quesnel. The mine, which employs 70 people, began production in April with milling operations beginning in June. Kinross Gold Corporation has spent over $20 million on construction to date and mined over 20 000 oz of gold and 8000 oz of silver during the year. Three separate orebodies have been discovered to date and there is good potential for additional discoveries. Underground development will begin this fall on the Midwest zone.

Bralorne-Pioneer Gold Mines Ltd., in a joint venture with International Avino Mines Ltd., plans to re-open the historic underground Bralorne mine near Lillooet. The project received a Project Development Certificate in March with development and final permitting applications progressing during the year. Mining and milling operations are forecast to start in 1997 at about 225 t/d, increasing to 400 t/d at a later date. The initial capital cost is estimated at between $5 million and $7 million, with annual output of 860 kg (27 500 oz) of gold and employment of 150.

Imperial Metals' Mount Polley copper-gold project has begun construction and will begin production operations in the fall of 1997. The company completed a modest program of widely spaced drill holes to test geochemical and geophysical anomalies peripheral to the main area of interest. The overall geological resource is estimated at 230 Mt grading 0.26% copper and 0.34 g/t gold. The capital cost of developing a 16 500-t/d open-pit mine is estimated at $110 million. Annual production is projected at 15 000 t of copper and 2180 kg (70 000 oz) of gold. The project will provide 170 new jobs.

A detailed pre-feasibility study was completed in 1995 on Taseko Mines Limited's Prosperity Gold (formerly Fish Lake) porphyry copper-gold deposit 125 km southwest of Williams Lake. The company has submitted an application for a Mine Development Certificate. In 1996, Taseko Mines Limited reached an agreement-in-principle on financing to assist in completing an angle re-drilling program to prove the gold and copper grade increases for the mineable reserve, estimated to contain 9.4 million oz of gold and 3.5 billion lb of copper. A detailed pre-feasibility study has confirmed the viability of the project, based on a throughput rate of 90 000 t/d.

Royal Oak Mines' Kemess South project was awarded a Project Development Certificate pursuant to the provincial *Environmental Assessment Act* in April 1996. The gold-copper project, 300 km northwest of Mackenzie in north-central B.C., will cost $390 million to develop and employ 550 during construction. Mineable reserves contain 4.1 million oz of gold and 990 million lb of copper. Mill throughput is proposed at 40 000 t/d, providing a mine life in excess of 14 years. The mine is expected to begin production in 1998 and will employ 350 workers.

The Huckleberry copper-molybdenum project received development certification in December 1995. Princeton Mining Corporation and a consortium of Mitsubishi Materials Corporation, Dowa Mining Co. Ltd., Furukawa Co. Ltd. and Marubeni Corporation formed a strategic alliance in 1995, involving several detailed financial agreements, to develop the project. Huckleberry Mines Ltd. will be the operating company, with 60% of the project held by Princeton and 40% held by the remaining consortium. Project costs for development, including inventory and working capital, are estimated to be $137 million. Current reserves are estimated at 93.9 Mt grading 0.50% copper, with minor recoverable amounts of gold, silver and molybdenum. Princeton announced in late May that it will go ahead with construction of the mine, which will employ 200, with a likely production start-up in the fall of 1997.

During 1995, Redfern Resources Ltd. conducted environmental and socio-economic studies associated with its application for mine development approval for its Tulsequah Chief property located 100 km south of Atlin in northwestern B.C. Total capital investment is estimated at over $170 million for a 2500-t/d operation employing over 200 people. Redfern reported positive results from a $1.5 million feasibility study. Revisions to the feasibility study were completed in early 1996.

Wheaton River Minerals Ltd./North American Metals Corp. Golden Bear mine closed in September 1994 due to the exhaustion of refractory ore reserves in the Bear Main zone. A Mine Development Certificate for a revised production plan to heap leach the Kodiak A ore has been issued; however, the project has since been postponed to the summer of 1997. A follow-up program during 1995 identified a drill-indicated reserve of 214 065 t grading 22.6 g/t gold. The mine is scheduled to re-open in mid-1997.

Exploration Highlights

Continued strength in gold and copper markets added momentum to grassroots and mid-level exploration programs on properties containing these two important minerals during 1995. Over 90% of all exploration dollars in B.C. are directed to base- and precious-metal properties. The remainder is spent on industrial mineral and coal properties.

The largest program was undertaken by American Bullion Minerals Ltd. on the Red-Chris copper-gold project near Iskut, estimated at $6 million, and included over 100 drill holes totalling approximately 36 700 m of diamond drilling. Drilling in the 1995 program increased the resource base estimated by American Bullion to more than 200 Mt. Geotechnical drilling was carried out in the fall for proposed tailings impoundment and open-pit design. In May 1996, the company announced that a positive pre-feasibility study had been completed and that it planned substantial additional expenditures.

Red Mountain, the project with the highest expenditures in 1994, was inactive during 1995. An aggressive exploration and development program worth several million dollars is planned for 1996 by Royal Oak Mines Inc., who purchased the project from Barrick Gold Corporation in 1995.

Fairfield Minerals Ltd. continued its bulk sampling program on the Siwash North vein of its Elk property near Merritt. Fairfield also completed an in-fill drilling program during 1995 in support of studies to determine the economics of future mining. Recently, Fairfield Minerals and Aurizon Mines Ltd. have concluded an option agreement that will entitle Aurizon to earn up to a 60% interest in the property by incurring exploration expenditures totalling $7 million over four years.

In the Rossland camp, International Silver Ridge Resources Ltd. and Pacific Vangold Mines Ltd. have been conducting underground development work and mining on the Iron Colt and Evening Star properties. During January and June 1995, the companies shipped approximately 1414 t of gold-bearing ore from the Iron Colt property for custom milling. On the Evening Star property, the operators have received a bulk sampling permit to extract 10 000 t. Development work, including drifting on the vein, is in progress.

International Skyline Gold Corporation undertook several studies required for the preparation of a preliminary feasibility study on its Bronson Slope property located adjacent to the Snip mine, 100 km north of Stewart. During 1995 Skyline completed a diamond drilling program designed to confirm previous mineral inventory estimates. The company has applied for a project approval certificate under the *Environmental Assessment Act* to develop a 12 000-t/d open-pit mine.

At the Taurus project in the Cassiar camp, Cyprus Canada Inc., under a joint-venture agreement with International Taurus Resources Inc. and Cusac Gold Mines Ltd., completed a major $2.8 million drilling program designed to delineate a large tonnage, low-grade, bulk-mineable (potentially heap-leachable) gold deposit. Cyprus completed metallurgical testing of different ore types. Follow-up drilling on induced polarization targets and closer-spaced drilling to test and define a starter pit are expected in 1996.

On the Harmony Gold project on Graham Island, Queen Charlotte Islands, which includes the Specogna (ex-Cinola) gold deposit, Romulus Resources Ltd. undertook a widespread airborne geophysical survey and regional geochemical surveys under an arrangement with Misty

Mountain Gold Limited. Geological re-interpretation of the Gold Creek and Juskatla volcanic complexes has suggested many previously unrecognized exploration targets within the area. Since 1970 when the Cinola deposit was discovered, over $40 million has been spent on this property. This work has defined an open-pit mining resource of 31.3 Mt grading 2.2 g/t gold. Previous work focused almost entirely on outlining a bulk-mineable, low-grade gold deposit; the current focus on the Specogna deposit is the potential for high-grade gold zones that could be mined underground.

In the northern part of the Highland Valley southwest of Kamloops, Getty Copper Corporation conducted an induced polarization survey and drilling program on the Getty North (Krain) copper-molybdenum property. The company is investigating the use of solvent extraction-electrowinning (leach) processing. The initial target is about 25 Mt grading 0.6% copper. The degree of mixing of oxide and sulphide minerals will have a significant impact on copper recovery. Nearby sulphide copper deposits are also being examined for processing by conventional milling techniques. Further work is expected on drilling and metallurgical studies towards a pre-feasibility study.

In the area between the Afton and Ajax deposits, Teck Corporation continued to drill-test the Rainbow copper-gold target under a joint-venture agreement with Getchell Resources Inc. Teck is continuing negotiations with Getchell on the Galaxy property located 1.5 km north of Teck's Ajax mine. Getchell reports that this property hosts an estimated 3.2 Mt grading 0.65% copper and 0.34 g/t gold.

In 1995, Imperial Metals Corporation conducted a surface diamond drilling program on the Giant Copper deposit east of Hope. It focused on expansion of the near-surface mineral resource in the AM Breccia zone. In September, the provincial government announced the creation of the Skagit Valley Class A Provincial Park. The Giant Copper property straddles the northern boundary of the Skagit Valley area; future access to the site is guaranteed under the *Park Act*.

In the Gataga district, southeast of the Cirque zinc-lead-silver deposit, Inmet Mining Corporation (formerly Metall Mining Corporation) continued to explore the depth potential of the Akie zinc-lead-silver deposit. Some drilling and considerable other surface exploration work was completed elsewhere on the property, and several large lead-zinc soil anomalies were discovered. The company also plans a significant diamond drilling program during 1996.

The Canarc Resource Corp. exploration program on the Polaris-Taku gold project near Atlin in northwestern B.C. involved deep drilling to test the potential of the C-vein and drilling on the North zone. Bulk underground mining and bioleaching are being investigated. Engineering, metallurgical, environmental and financial studies are being prepared to assess the potential for a moderate-tonnage underground gold mining operation. The company is undertaking a $5 million underground exploration and feasibility study in 1996.

Spokane Resources Ltd., under an option agreement with Rio Algom Limited, completed geochemical, geophysical surveys and geological mapping during 1995 on the Mac molybdenum-copper deposit located 100 km east of Smithers. Spokane also completed a small drilling program designed to extend and further test previously discovered mineralized zones.

In the Wells-Barkerville area, famous for both its lode and placer gold production, International Wayside Gold Mines Ltd., together with joint-venture partners Mosquito Consolidated Gold Mines Limited and Gold City Mining Corporation, conducted an underground exploration drilling program of the Cariboo Gold Quartz mine. The main objective was to outline a zone of gold vein mineralization in the Rainbow zone which could be mined by open-pit methods. Drilling during 1995 suggests that mineralized veins in the Rainbow zone extend to surface and the potential for development of this type of ore is now being examined.

Athabasca Gold Resources Ltd. started underground development on the Idaho zone and surface drilling in the McMaster zone on its Ladner Creek (Carolin) gold property 18 km northeast

of Hope. The targets are turbidite-hosted, mesothermal, epigenetic deposits, similar to those mined during the 1982-84 period. Preliminary results from both areas of drilling are encouraging.

Coal and Industrial Minerals

Advanced exploration expenditures outside existing coal mine leases are estimated at $1.5 million in 1995. At the Telkwa thermal coal project, Manalta Coal Limited conducted an extensive exploration program south of the Telkwa River. A total of 83 holes were drilled at a cost of around $1 million. The coal quality is very good, with high heat value and low sulphur content. The company continues to evaluate production feasibility.

At the Willow Creek coal property 50 km west of Chetwynd, Globaltex Industries reached an agreement in principle late in 1995 with BC Rail and Mitsui Matsushima Co. Ltd. to fund feasibility work in 1996 towards mine development. Production of 600 000 t/y of thermal and semi-hard coking coal could start as early as 1997, pending approvals and permitting. The mine would create 100 new jobs. Pine Valley Coal Ltd. is the operator.

In southeastern B.C., McGillivray Mining Ltd. undertook exploration and test mining on its Loop Ridge metallurgical coal property in the Crowsnest Pass. A 10 000-t bulk sample was mined and trucked to the Elkview plant for washing. It is hoped that a minimum of 400 000 t can be mined from the property over a period of two to five years and be sold raw to the Elkview mine.

Industrial minerals are receiving increasing attention with 1995 exploration expenditures estimated to be up slightly from 1994. A number of industrial mineral projects requested and received approvals for bulk sampling and test mining during the year. These operations continue to diversify the mineral commodity base of the province to include zeolites, gemstones, sapphires, aquamarine, scoria, graphite, sericite, and others. The Monteith Bay (geyserite) pyrophyllite-silica project of New Global Resources received development approval in 1995.

1996 Outlook

The outlook for exploration in 1996, as indicated by industry survey results, is for overall expenditures to increase by nearly 50% to $123.5 million. Higher expenditures involving pre-development work at properties nearing a production decision account for half of the $40 million year-over-year increase in provincial exploration. Exploration spending at operating mine sites is forecast to more than double from $4.2 million to $8.6 million. In 1996, the northwest and south-central areas of the province are expected to continue to receive the largest share of exploration activity in dollar terms.

B.C. Initiatives for Mining and Exploration

The Province is providing infrastructure assistance for new mine developments and expansions. The Huckleberry, Kemess South and Red Mountain development projects and the Quinsam mine are recipients of this initiative. Infrastructure assistance includes items such as improving road access, extending power transmission lines, and building trans-shipment and port facilities.

Major tax relief initiatives announced in 1994, including coal mineral tax rate reductions, pooling of exploration expenses and rapid write-off of capital expenditures under the *Mineral Tax Act,* continue. The list of equipment for exploration and mining exempted from sales tax has been expanded. Preferential lower fuel tax rates for exploration and mining are also ongoing.

Explore B.C., a $13.5 million three-year program to provide exploration incentives, continued for a second year in 1995. Included in Explore B.C. is the Prospectors' Assistance Grant Program. This program, designed to promote grassroots prospecting for new mineral deposits, continues to be successful. It will contribute up to 75% of eligible costs of an approved project to

a maximum of $10 000. Sixty-eight grants were awarded in 1995 from a budget totalling approximately $500 000.

In the industrial minerals sector, a provincial initiative, which includes a partnership with B.C. Trade, was set up to promote the marketing of industrial minerals in the province, in Pacific Rim countries, and in Europe.

Provincial geoscience programs managed by the Geological Survey Branch focused on areas with significant identified potential (Interior Plateau, Gataga, Tatogga, and Babine) and on regions where existing mines are expected to close in the next few years (northern Vancouver Island, East Kootenays and northern Selkirks). The results of these programs are expected to encourage base- and precious-metal exploration in these areas and elsewhere.

A five-year Nechako Plateau-Babine Porphyry Belt mapping program was initiated between the B.C. Geological Survey Branch and the Geological Survey of Canada to detail Nechako River, Fort Fraser and parts of the Smithers and Prince George map areas. In addition, there will be regional/national geochemical reconnaissance surveys completed in specific parts of this region.

A $600 000 multi-parameter airborne geophysical survey, funded by the provincial government, has also been initiated. The project includes three targeted areas in the East Kootenay region of southeastern British Columbia. The objectives of the survey are to identify possible Sullivan-type orebodies and other targets. Results of the Regional Geochemical Survey of the Cry Lake area will be released in 1996.

5.11 NORTHWEST TERRITORIES

1995 Production Summary

Preliminary figures for 1995 show that the Northwest Territories (N.W.T.) supplied 5.9% of the total value of Canada's metallic minerals. The operating mines in the N.W.T. produced 16.4% of Canada's zinc, 9.2% of its gold, 15.5% of its lead and 1.5% of its silver.

The preliminary value of metallic minerals shipped from N.W.T. mines increased for the second straight year from $493.7 million in 1994 to $520 million in 1995. Zinc and gold are the primary commodities of the N.W.T.

The volume of gold shipments increased slightly in 1995 for the first time since 1991. The N.W.T.'s 13 758 kg of gold worth $234 million makes the N.W.T. the fourth largest gold producer in Canada. The value of gold produced forms 45% of the N.W.T.'s total metallic minerals production in 1995.

Zinc continues to be the most valuable commodity to the N.W.T. as its value of $254.6 million represents 49% of the N.W.T.'s metallic minerals. The total tonnage increased 4% from 171 840 t in 1994 to 178 965 t in 1995. The N.W.T. is Canada's second largest zinc producer.

Lead shipments decreased slightly from 34 126 t in 1994 to 31 542 t in 1995, with a value of $26.8 million. The N.W.T. remained Canada's third largest lead producer.

1995 Exploration Summary

Exploration continued to increase in 1995 for the fifth straight year. The N.W.T. was first in Canada, for the second straight year, with exploration expenditures of $189 million in 1995. Exploration was more focused in 1995 with fewer prospects (306) being evaluated than in 1994 (737). However, the number of prospects being drilled more than doubled from 100 in 1994 to 202 in 1995.

While diamonds are driving much of the activity, exploration for gold and base metals remains strong. Total surface drilling for gold was 29% greater than surface drilling for diamonds, although 81% more targets were drilled for diamonds.

Over 4600 claims were staked in 1995 covering over 3.4 million ha. In 1995, 263 prospecting permits were issued covering areas of Baffin Island, Melville Peninsula, Keewatin, Cordilleran, Victoria, and Melville Islands. Total claims in good standing (April 1996) were 18 150 covering over 15 million ha.

The full EARP (Environmental Assessment Review Process) review continues on the BHP/Dia-Met diamond project. Public hearings and consultations were completed in February 1996 and the panel's recommendation will be made in June 1996. A decision by the federal government is anticipated shortly afterwards, followed by issuance of regulatory permits, if the decision is positive. In early fall some on-site construction and ordering of materials will begin. Full-scale construction will start once materials arrive on site over the 1997 winter road. Production would begin in 1998. The project description outlines plans to develop and mine five kimberlite pipes over a 25-year period.

Kennecott Canada Inc. continues to work on the Diavik joint-venture properties (with Aber Resources Ltd. and a number of other companies). Bulk sampling of the A-154 pipe began and very preliminary results confirm earlier drill results with a grade over 4 ct/t.

Bulk sampling is also under way at the Jericho (Lytton/New Indigo) pipe (underground) and the AK-5034 (Mountain Province) pipe.

A more detailed discussion of these diamond projects can be found in Section 4 of this report (Exploration for Diamonds).

BHP Minerals has begun a bulk sampling program on the Boston (gold) property 170 km south-southeast of Cambridge Bay. The bulk sample will be trucked to the Arctic Coast and shipped out this summer for processing.

Another bulk sampling program is under way at the New Discovery Mines gold property 85 km north of Yellowknife. The Discovery mine produced one million oz of gold between 1950 and 1969. GMD Resources Corp. (50%) and New Discovery Mines Ltd. (50%) have identified additional reserves at the mine site and in an associated zone to the south. A feasibility study is under way with production anticipated in 1997/98.

The Nicholas Lake gold property, located 90 km north of Yellowknife, was sold by Athabasca Gold Resources Ltd. to Royal Oak Mines Ltd. for $3.5 million. Plans to mine the deposit for milling at the Giant mine are under way.

Echo Bay Mines Ltd. purchased the Ulu gold deposit from BHP Minerals Ltd. for $10 million plus a net smelter return. Echo Bay plans to mine the deposit as a satellite deposit of the Lupin mine, 120 km to the south. A prefeasibility study has outlined 1.7 Mt of ore containing 19 000 kg of gold. The timing of production is critical to the continued operations at Lupin. Echo Bay intends to start production during the 1998 winter road season.

The Damoti Lake (gold) property is located 190 km north of Yellowknife and within 12 km of the winter road serving the Colomac mine. The property, now 100% owned by Quest Resources, is currently going underground. Several other gold properties in the area are being actively explored.

The Meliadine gold property 20 km north of Rankin Inlet is the most advanced property being actively explored in the Keewatin region. The eastern half of the large (41 000 ha) property is owned by Cumberland Resources Ltd. (50%) and Comaplex Resources (50%) who have a $2 million exploration program planned for this summer. The western half of the property has been optioned by WMC Ltd.

Increased exploration interest for base metals on Baffin Island coincided with a geological mapping program by the Geological Survey of Canada, and a massive sulphide prospect found by International Capri Resources Ltd. The regional geology is considered similar to that hosting the Raglan and Voisey's Bay deposits.

Exploration activity in the Cordillera has increased as a result of discoveries in the Yukon and results from the Prairie Creek base-metal property. Reserve estimates for the Prairie Creek deposit were increased to 10.6 Mt grading 13.1% zinc, 11.3% lead and 188 g/t silver in December 1995. Aur Resources Inc. has optioned the Cantung property and is re-evaluating the deposit. Firesteel Resources explored its property in the central Mackenzie mountains for zinc.

In March 1996, the Mineral Initiatives part of the 1991-1996 Canada-N.W.T. Economic Development Agreement ended. The highly successful program generated over $13.5 million in incremental exploration expenditures during the past five years, exceeding the $8.2 million cost of the program. The full extent of the Initiatives' impacts will only be known in the long term.

The Government of the N.W.T. announced in April 1996 that the departments of Energy, Mines and Petroleum Resources, Economic Development and Tourism, and Renewable Resources would be combined into one department to provide one-stop shopping for economic development. The consolidation will be effective August 19, 1996. The new entity will be called the Department of Resources, Wildlife and Economic Development.

5.12 YUKON

Hardrock metal production resumed at the Vangorda and Grum mines at Faro in August 1995, and development began on two other projects, Brewery Creek and Mt. Nansen. Six other mining projects are currently under environmental review and, upon successful completion of the process, are expected to begin mine development in 1996 or 1997, with the result that the Yukon could have eight operating mines by 1998.

In 1995, exploration expenditures totalled just under $40 million, representing a 60% increase over 1994 figures. Mining development expenditures were $57 million compared to $11 million in 1994. A total of 14 207 new quartz claims were recorded in 1995, and the number of quartz claims in good standing increased to 56 444.

Exploration occurred on more than 50 mineral properties in the Yukon in 1995, with eight projects accounting for 65% of exploration expenditures. Increased exploration was noted in all categories from grassroots levels to advanced projects. The eight exploration projects receiving the bulk of exploration dollars spent in the territory include Brewery Creek, Dublin Gulch, Fairchild, Red Mountain, Keno Hill, Kudz Ze Kayah, Laforma, and Wolverine.

Gold and base metals continue to be of interest in the Yukon and the following are the highlights of 1995:

- Base-metal production resumed at the Grum and Vangorda deposits at Faro owned by Anvil Range Mining Corporation.
- Loki Gold Corporation received a Class "A" Water Licence for the operation of a heap leach gold mine near Dawson City, Yukon's first heap leach mine.
- B.Y.G. Natural Resources Inc. received a Class "A" Water Licence for the operation of a gold mine near Carmacks.
- Westmin Resources Limited discovered a new polymetallic volcanic-hosted massive sulphide body at the south end of Wolverine Lake in the Finlayson Lake area. The Wolverine Zone is

located approximately 20 km east of Cominco Ltd.'s 1993 Kudz Ze Kayah discovery and confirms the significant mineral potential of the Finlayson Lake area and other parts of the Yukon-Tanana terrane, which underlies much of central Yukon.

- Three socio-economic agreements were signed between mining companies and First Nations.

1995 Production Summary

Ore processing commenced at Anvil Range Mining Corporation's Vangorda and Grum deposits on August 6, 1995, and the first concentrate shipment left the Port of Skagway in September 1995 destined for Asian customers. Between November 1994 and October 1995, Anvil Range removed a total of 27 Mt of overburden from the Grum orebody and mined 2.5 Mt from the Vangorda and Grum deposits. Anvil Range has made significant improvements to the milling and concentrating facilities and expects to produce 510 000 t of concentrate annually. Anvil has secured long-term contracts with two international smelters and all production for the next six to seven years has been sold ahead.

1995 Development and Exploration Summary

Loki Gold Corporation received a Class "A" Water Licence on August 9, 1995, for the Brewery Creek property. The property is located 57 km east of Dawson City. During 1995, Loki Gold upgraded the access road from the property to the Dempster Highway, constructed a double-lane haul road from the pad site to the Upper Fosters Zone, mined ore from the Upper Fosters Zone to be used for the pad overliner, and began preparation of the heap leach pad and solution ditches and ponds. Loki spent $10 million on development in 1995 and signed a socio-economic agreement with the Tr'on dek Hwech'in (Dawson First Nation).

B.Y.G. Natural Resources Inc. received a Class "A" Water Licence for the Mount Nansen gold-silver property located approximately 60 km west of Carmacks. Development work in 1995 consisted of completing the final tailings impoundment design and stripping the borrow areas, rehabilitation of the existing kitchen and office buildings, installation of the camp, and upgrading the existing mill. The mill is being upgraded to 700 t/d and a carbon-in-pulp cyanide circuit will be added. Exploration drilling was done on three different targets in addition to continued geological work on the property and in the Mount Nansen area.

The Minto deposit located about 80 km northwest of Carmacks is owned by Minto Explorations Ltd. The company proposes to mine the copper-gold-silver deposit using a combination of open-pit and underground methods and process the ore through a conventional mill. The Minto project received a positive feasibility study in early 1995 and the company has since directed most of its efforts toward engineering, geotechnical and environmental studies in support of permit applications.

The Carmacks Copper project, located 46 km northeast of Carmacks, is a low-grade heap leachable copper deposit owned by Western Copper Holdings Limited and Thermal Exploration Company. The Company received a positive feasibility study in 1994, and in 1995 most of the Company's efforts were directed toward various studies required for environmental permitting.

First Dynasty Mines Ltd. of Denver, Colorado, is proposing a large-tonnage heap leach gold operation on the Dublin Gulch property located approximately 40 km northeast of Mayo. First Dynasty spent approximately US$3.2 million on the property during 1995 for drilling, metallurgical testing, engineering studies, and economic evaluations of the various project alternatives.

Kudz Ze Kayah is a polymetallic base-metal deposit located about 110 air km southeast of Ross River and 20 km southwest of Finlayson Lake on the Robert Campbell Highway. Cominco Ltd. spent $3.5 million during 1995 on advanced exploration and $800 000 on grassroots exploration. The ABM deposit was drilled to the status of a mineable reserve and an all-weather access road was constructed to the property. Engineering, metallurgical and environmental studies continued. Cominco and the Ross River Dena Development Corp. signed a socio-economic participation agreement in May 1995.

United Keno Hill Mines Limited completed a large underground exploration program during 1995 at Keno Hill. The underground program also tested new mining methods that will result in lower operating costs when mining resumes.

In 1995, YGC Resources Ltd. conducted a $500 000 diamond drilling program at the Ketza River property, located 50 km south of Ross River, and identified additional gold oxide mineralization. Exploration and a reinterpretation of the property geology at Ketza River led to the discovery of two new oxide zones and an extension to the B-Mag Zone.

Westmin Resources Limited and Atna Resources Ltd. discovered the Wolverine polymetallic deposit in 1995. The Wolverine deposit is located approximately 130 km southeast of Ross River. The 1995 drilling program was successful and outlined a geological resource of 3.05 Mt grading 1.27% copper, 1.43% lead, 12.99% zinc, 350.2 g/t silver and 1.87 g/t gold. Westmin Resources managed the 1995 exploration program and spent over $3 million. Discussions with the Ross River Dena Development Corp. have been initiated.

The Fairchild project, located in northeastern Yukon, is composed of 14 properties collectively being explored by Newmont-Westmin-Pamicon and Equity Engineering. In 1995, the joint-venture group conducted a 50-hole, 5800-m drill-supported exploration program.

The Red Mountain property, located northwest of Mayo, is owned by Regent Ventures. Nine reverse circulation holes totalling 1233 m were drilled in March 1995 and a follow-up program of diamond drilling followed in August 1995.

Cominco Ltd. conducted an underground drill program in the spring of 1995 at the Sa Dena Hes mine located 70 km north of Watson Lake. This program confirmed the ore outline and continuity, and now allows the company to prepare a mine plan. The mine remains shut down under care and maintenance awaiting an improvement in metal prices.

Cash Resources Ltd. conducted drilling, trenching, geological mapping and extensive environmental studies on its Division Mountain coal project in 1995. The deposit is located 20 km west of the Klondike Highway (at Braeburn) and the Yukon Energy Corporation electrical transmission grid. The program was successful in outlining additional geological reserves. Cash Resources is discussing the coal project with major thermal power generating companies and Yukon Energy Corporation, and has been approached by four coal-producing companies with a view to exploiting the Pacific Rim thermal export market.

Placer Mining

Placer gold mining continues to be a major industry in the Yukon, as it has been since the Klondike Gold Rush of 1898. Production to the end of 1995 was 127 333 crude oz valued at over C$54 million. This is a 10% increase over 1994 production, and continues a rising trend that started in 1992. In 1995, approximately 220 placer mines were operating in the Yukon, providing direct employment to an estimated 700 people. There are currently about 300 placer leases and 17 500 placer claims in good standing, mostly in historic areas such as the Klondike.

Exploration and Development Forecast for 1996

The Yukon Chamber of Mines conducted a survey of exploration companies doing work in the Yukon and estimated that $45 million-$50 million will be spent on exploration during 1996.

Yukon Government Programs

The Yukon government currently has three programs to encourage the development of the Yukon's mineral and energy resources: the Yukon Mining Incentives Program (YMIP), the Yukon Industrial Support Policy, and the Energy Infrastructure Loans for Resource Development Program.

Yukon Mining Incentives Program

The Yukon Mining Incentives Program is designed to promote and enhance mineral prospecting, exploration and development activities in the Yukon. The program's function is to provide a portion of the risk capital required to locate and explore mineral deposits. Grassroots programs (Prospecting and Grubstake categories) are conducted on open ground (Crown land), and Target Evaluation programs are conducted on newly discovered prospects and targets covered by mineral claims, placer prospecting leases and claims, and coal licences and leases. Technical assistance is offered to prospectors upon request.

Program funding for 1995/96 was $720 000. The number of grants approved in each category includes 27 in the Grassroots programs and 32 in the Target Evaluation Program. Approximately 29% of the total funding was allocated to placer gold exploration projects.

Yukon Industrial Support Policy (YISP)

The Yukon government recognizes the lack of infrastructure in many regions of the Yukon and this program encourages the development of public infrastructure by the private sector in the Yukon. The Yukon government enters into a development agreement with the resource development sector for projects that require road improvement or construction, energy supply, grid connections, or related training programs for Yukon residents.

Loki Gold Corporation received $2.479 million in financial assistance from the Yukon government for upgrading the access road into Brewery Creek in 1995.

Energy Infrastructure Loans for Resource Development Program

This program assists the resource development sector in the Yukon by helping to defer the capital cost of building energy infrastructure. The program provides loans to companies to help them create electrical infrastructure to meet their energy needs. No projects were approved under this program in 1995.

6. Historical Perspective on Mineral Exploration

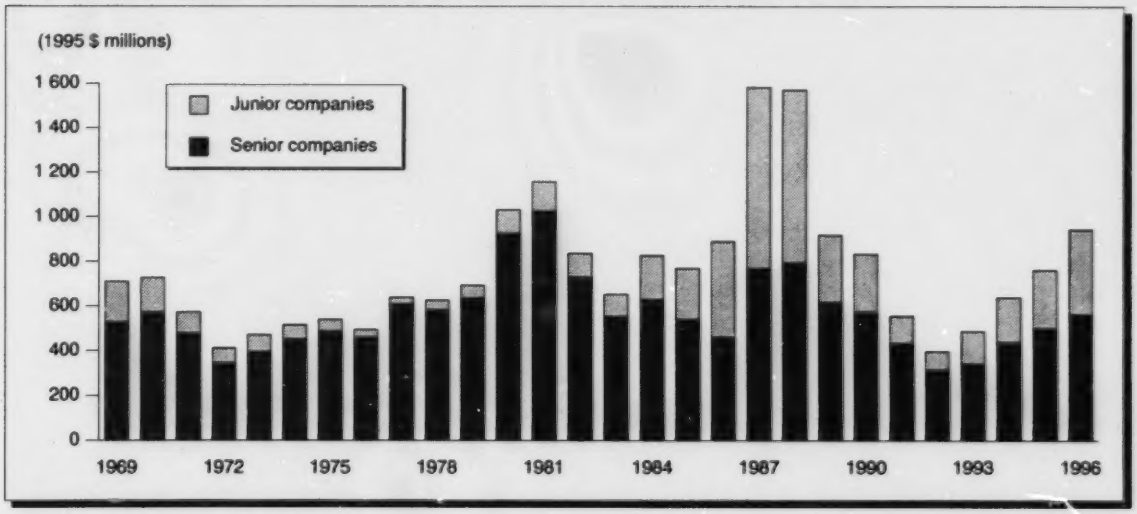
6.1 INTRODUCTION

This section presents an historical review of patterns of exploration spending by region, by commodity sought, and by type of company. This analysis is based on results from the federal-provincial survey of mining and exploration companies.

6.2 HISTORICAL SUMMARY AND PERSPECTIVE

Figure 20 depicts (in constant 1995 dollars) Canadian exploration expenditures over the 28 years from 1969 through 1996. Above-normal exploration expenditures in the 1980-82 period resulted from high prices for gold, silver and copper over much of that period. Exploration expenditures declined somewhat in 1983, but generally rose from 1984 to 1988 as a result of the introduction by the federal government, in 1983, of the Mining Exploration Depletion Allowance (MEDA). MEDA was replaced in 1989 and 1990 by the Canadian Exploration Incentive Program (CEIP). By 1987 and 1988, exploration expenditures had reached unprecedented high levels because of MEDA and because of the high gold prices that had existed until the end of 1987. However, exploration fell dramatically after 1988. Exploration expenditures decreased between 1989 and 1992, when they reached their lowest level since 1967.

Figure 20
Exploration Expenditures in Canada by Junior and Senior Companies, 1969-96



Sources: Natural Resources Canada; Statistics Canada.
Notes: Total exploration expenditures for 1975-81 are overstated by an average of about 17% relative to earlier and later years because of changes to the methodology used by Statistics Canada over the years. Overhead expenditures are included. 1995 data are preliminary estimates; 1996 data are company spending intentions.

Exploration expenditures are continuing to increase from their 1992 low. By 1996 they will be about 2.5 times the 1992 level. The upward surge in expenditures since 1992 has been driven principally by important discoveries of diamond deposits, leading some companies to invest in advanced exploration or deposit appraisal projects. In late 1994, the nickel-copper-cobalt discovery at Voisey's Bay, Labrador, a result of exploration for diamonds in that area, attracted the attention of many mining companies, particularly junior exploration companies. This deposit is potentially the richest base-metal find in Canada in decades. The resulting flurry of exploration activity in the area is likely to be sustained for some time.

Stronger metal prices have also helped boost exploration activity. For example, nickel, copper and lead prices, expressed in Canadian dollars, increased by more than 60% between 1993 and 1995, silver prices increased by about 30%, and gold prices increased by 14%. For most of the first half of 1996, metal prices have compared favourably with those of 1995. Gold prices started the year strongly, but have since declined to their 1995 levels. Base-metal prices have generally maintained or increased their levels relative to 1995. The outlook for base-metal prices is, on the whole, positive, given the supply and demand factors anticipated over this year and next. Copper is an exception with production expected to outstrip demand through 1997. This is reflected in the copper price which, for the first half of 1996, has averaged about 13% lower than last year's average, and is generally forecast to decline further in 1997.

6.3 EXPLORATION EXPENDITURES BY PROVINCE AND TERRITORY

Table 11 shows current dollar expenditures on mineral exploration in Canada, by province and territory, for the 1985-96 period. **Table 12** reports the same information, but in constant 1995 dollars. **Table 13** presents these data as percentages.

In recent years, Québec and Ontario have been the provinces with the greatest amount of exploration activity. In 1993, for the first time since 1982, exploration spending in these two provinces fell to below 40% of the Canadian total, having peaked at 65% in 1987. In 1994, the Northwest Territories was the most actively explored region. It will likely retain that ranking during 1995 and 1996. The high levels of diamond exploration expenditures have helped boost the Northwest Territories' national contribution to over 20% since 1993. These are the highest percentages for the Northwest Territories since Canadian exploration statistics were first collected in 1946. Previously, the Northwest Territories ranked either fourth or fifth nationally.

Since 1993, Ontario has fallen into third place behind the Northwest Territories and Québec. Activity has resumed strongly in British Columbia with an 87% increase expected to have occurred over the 1993-96 period.

6.4 EXPLORATION EXPENDITURES BY TYPE OF COMPANY

Figure 21 depicts field exploration expenditures by type of company from 1985 to 1994. Total exploration expenditures (fieldwork plus overhead) for 1989 to 1995 (preliminary) and 1996 (intentions) by type of company are portrayed in **Figure 22**. Only field exploration totals are available for the years 1985-88.

In constant 1995 dollar terms, exploration by producing companies and their affiliates peaked in 1987-88, declined until 1992, and started to increase in 1993. In reality, this period of decline may not be as large as it appears because it includes considerable contributions made during the 1986-88 period by junior companies to joint-venture projects operated by senior companies. These contributions were counted as part of senior companies' spending, thus overstating senior expenditures and understating junior expenditures during the period 1986-88. Expenditures by senior companies should continue to increase during 1995 and 1996, thus showing a total increase of about 80%, in constant dollars terms, for the 1992-96 period.

TABLE 11. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE AND TERRITORY, 1985-96 (CURRENT DOLLARS)

Province	Field Work Only				Total Exploration[1]							
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995p	1996f
	($ millions)											
Newfoundland	11.9	12.3	27.7	37.7	36.2	23.3	12.1	11.1	8.9	12.4	70.8	111.3
Nova Scotia	7.8	17.2	41.6	46.7	21.4	11.0	4.5	3.3	1.8	1.7	1.8	2.3
New Brunswick	12.1	10.8	9.1	13.8	13.6	16.5	15.8	12.2	11.1	10.0	17.5	20.1
Québec	135.2	241.4	415.5	328.2	185.0	196.4	138.1	94.1	106.1	130.3	137.6	175.7
Ontario	93.2	136.8	308.1	343.6	217.8	152.6	109.7	77.4	75.6	113.0	135.9	158.7
Manitoba	33.7	26.3	40.0	30.0	37.0	41.2	29.7	32.0	27.4	40.5	35.5	33.3
Saskatchewan	39.4	36.8	63.5	61.1	63.3	42.2	31.5	25.9	53.1	50.6	46.8	42.6
Alberta	14.7	3.0	2.5	4.3	6.2	10.7	6.6	5.4	7.3	9.4	12.0	14.9
British Columbia	73.0	63.1	142.6	196.8	186.6	226.5	135.7	71.6	66.0	85.0	83.5	123.5
Yukon Territory	22.7	27.9	29.0	38.6	15.1	18.4	16.5	9.7	19.2	25.7	32.6	43.5
Northwest Territories	46.8	35.8	59.0	66.5	45.7	36.0	31.6	42.7	100.7	149.5	189.5	219.3
Total field work (excluding overhead)	490.5	611.4	1 138.6	1 167.3	703.5	660.3	439.2	323.5	410.1	540.5	. .	. .
Total exploration[2] (including overhead)	605.8	723.3	1 300.0	1 350.0	827.9	774.7	531.8	385.3	477.3	628.1	763.5	945.2

Source: Federal-provincial survey of mining and exploration companies.
. . Not available; f Forecast; p Preliminary estimate.
1 "Total exploration" includes related overhead expenditures. 2 For the years 1985-88, totals with overhead were calculated by multiplying the field expenditures by the ratio total/field from Statistics Canada.
Note: Numbers may not add to totals due to rounding.

TABLE 12. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE AND TERRITORY, 1985-96 (1995 DOLLARS)

Province	Field Work Only				Total Exploration[1]							
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995p	1996f
	($ millions)											
Newfoundland	15.5	15.7	33.7	43.9	40.2	25.1	12.7	11.5	9.1	12.6	70.8	111.3
Nova Scotia	10.2	21.9	50.7	54.4	23.8	11.8	4.7	3.4	1.8	1.7	1.8	2.3
New Brunswick	15.8	13.8	11.1	16.1	15.1	17.8	16.5	12.6	11.4	10.2	17.5	20.1
Québec	176.5	307.9	506.1	382.1	205.6	211.4	144.6	97.3	108.6	132.6	137.6	175.7
Ontario	121.7	174.5	375.3	400.0	242.0	164.3	114.9	80.1	77.3	114.9	135.9	158.7
Manitoba	44.0	33.5	48.7	34.9	41.1	44.3	31.1	33.0	28.1	41.2	35.5	33.3
Saskatchewan	51.4	46.9	77.3	71.1	70.3	45.4	33.0	26.8	54.4	51.5	46.8	42.6
Alberta	19.2	3.8	3.0	5.0	6.9	11.5	6.9	5.6	7.5	9.6	12.0	14.9
British Columbia	95.3	80.5	173.7	229.1	207.3	243.8	142.1	74.0	67.6	86.4	83.5	123.5
Yukon Territory	29.6	35.6	35.3	44.9	16.8	19.8	17.3	10.0	19.7	26.2	32.6	43.5
Northwest Territories	61.1	45.7	71.9	77.4	50.8	38.8	33.1	44.2	103.1	152.1	189.5	219.3
Total field work (excluding overhead)	640.3	779.8	1 386.8	1 358.9	781.7	710.8	459.9	334.5	419.8	549.8	. .	. .
Total exploration[2] (including overhead)	790.9	922.6	1 583.4	1 571.6	919.9	833.9	556.9	398.5	488.5	639.0	763.5	945.2

Source: Federal-provincial survey of mining and exploration companies.
. . Not available; f Forecast; p Preliminary estimate.
1 "Total Exploration" includes related overhead expenditures. 2 For the years 1985-88, totals with overhead were calculated by multiplying the field expenditures by the ratio total/field from Statistics Canada.
Numbers may not add to totals due to rounding.

TABLE 13. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE AND TERRITORY, 1985-96 (PERCENT DISTRIBUTION)

Province	Field Work Only				Total Exploration							
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995p	1996f
						(%)						
Newfoundland	2.4	2.0	2.4	3.2	4.4	3.0	2.3	2.9	1.9	2.0	9.3	11.8
Nova Scotia	1.6	2.8	3.7	4.0	2.6	1.4	0.8	0.8	0.4	0.3	0.2	0.2
New Brunswick	2.5	1.8	0.8	1.2	1.6	2.1	3.0	3.2	2.3	1.6	2.3	2.1
Québec	27.6	39.5	36.5	28.1	22.3	25.4	26.0	24.4	22.2	20.7	18.0	18.6
Ontario	19.0	22.4	27.1	29.4	26.3	19.7	20.6	20.1	15.8	18.0	17.8	16.8
Manitoba	6.9	4.3	3.5	2.6	4.5	5.3	5.6	8.3	5.7	6.5	4.6	3.5
Saskatchewan	8.0	6.0	5.6	5.2	7.6	5.4	5.9	6.7	11.1	8.1	6.1	4.5
Alberta	3.0	0.5	0.2	0.4	0.7	1.4	1.2	1.4	1.5	1.5	1.6	1.6
British Columbia	14.9	10.3	12.5	16.9	22.5	29.2	25.5	18.6	13.8	13.5	10.9	13.1
Yukon Territory	4.6	4.6	2.5	3.3	1.8	2.4	3.1	2.5	4.0	4.1	4.3	4.6
Northwest Territories	9.5	5.9	5.2	5.7	5.5	4.6	5.9	11.1	21.1	23.8	24.8	23.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

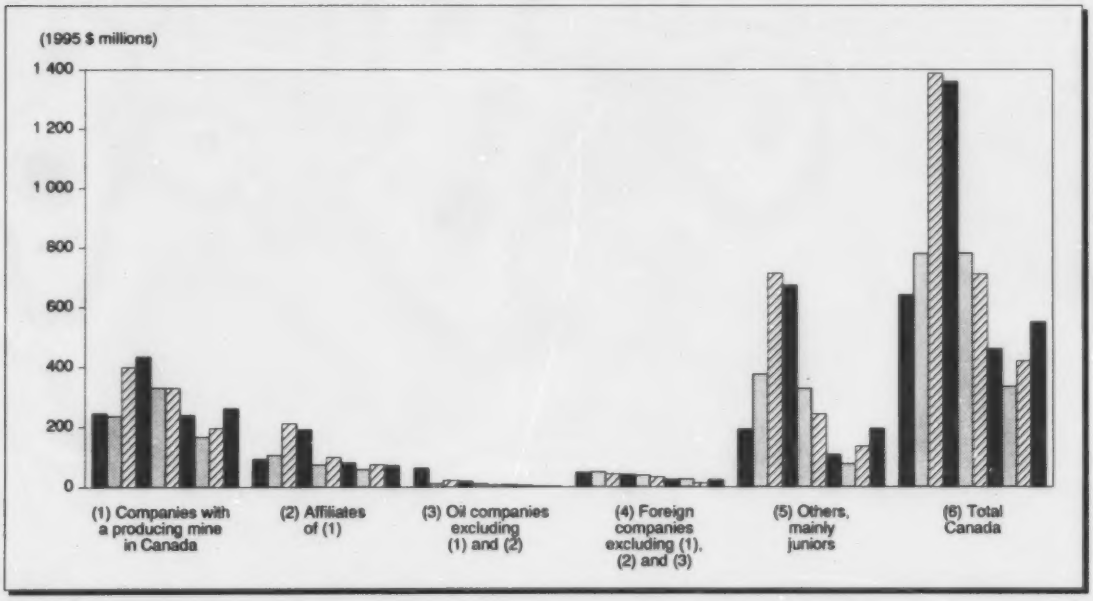
Source: Federal-provincial survey of mining and exploration companies.
f Forecast; p Preliminary estimate.
Notes: The percentages from 1985-88 are calculated on field work only, but those from 1989-96 are based on total expenditures, which include related overhead.
Numbers may not add to totals due to rounding.

Exploration expenditures by junior companies followed the same pattern as those by senior companies (**Figures 20 and 23**), peaking in 1987-88, then decreasing until 1992 (the lowest amount since 1980), and then increasing again through 1996. This year, junior spending could represent almost five times the amount reported in 1992. Although junior company exploration expenditures are lower than their high levels of 1987-88, they are still higher than they were before 1984 and comparable to levels reported during 1984-85 and 1986 (**Figure 20**).

Exploration expenditures by junior companies increased more than eightfold from 1983 to 1987 from about $98 million to almost $814 million (in 1995 constant dollars). In 1983, these companies accounted for about 15% of total Canadian exploration expenditures, but by 1987 this proportion had increased to 51%. In 1988, expenditures by the juniors began to decline. The decline continued through 1992, when the lowest amount since 1980 was recorded. Junior expenditures accounted for 21% of total exploration expenditures in 1992. They climbed to 30%, 31%, 34% and an expected 40% successively during the 1993-96 period.

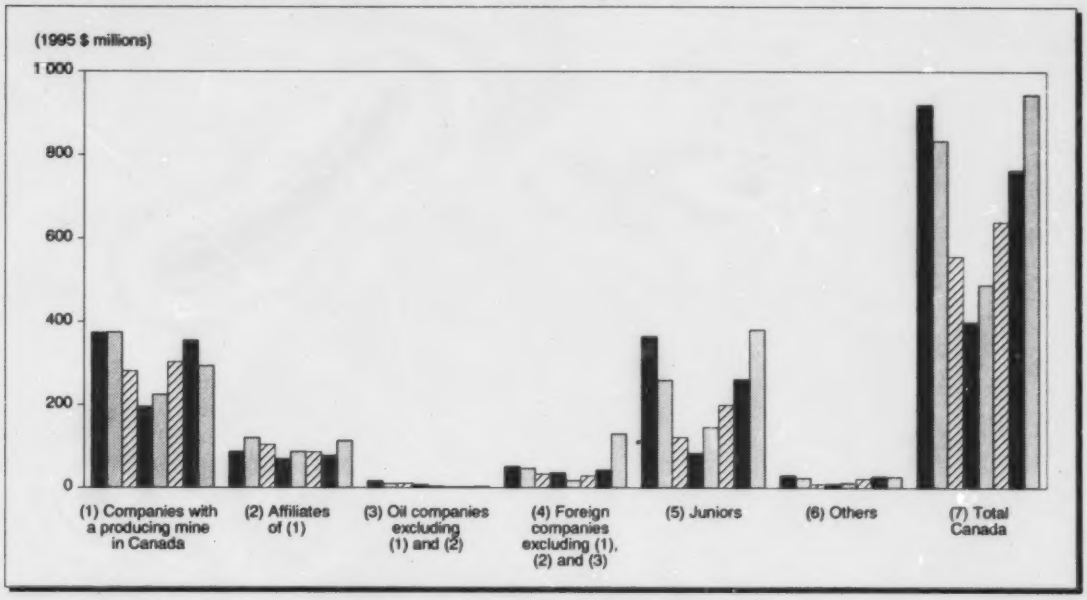
From 1985 to 1994, non-petroleum exploration expenditures by oil companies declined in constant dollars by more than 98%. In 1977, oil companies accounted for some 24% of total non-petroleum exploration, but in 1994 they accounted for less than 1%. Foreign companies' expenditures also declined by 74% from 1985 to 1993. These companies accounted for over 18% of expenditures in 1973 and 1979, but in 1994 they accounted for only 4%. Foreign companies' expenditures in 1994 have increased by 65% and will likely further increase by 50% in 1995 and 200% in 1996 (**Figure 22**). Mineral exploration expenditures by oil companies are also expected to increase from $1.8 million in 1995 to $2.6 million in 1996.

Figure 21
Field Exploration Expenditures by Type of Company, 1985-94



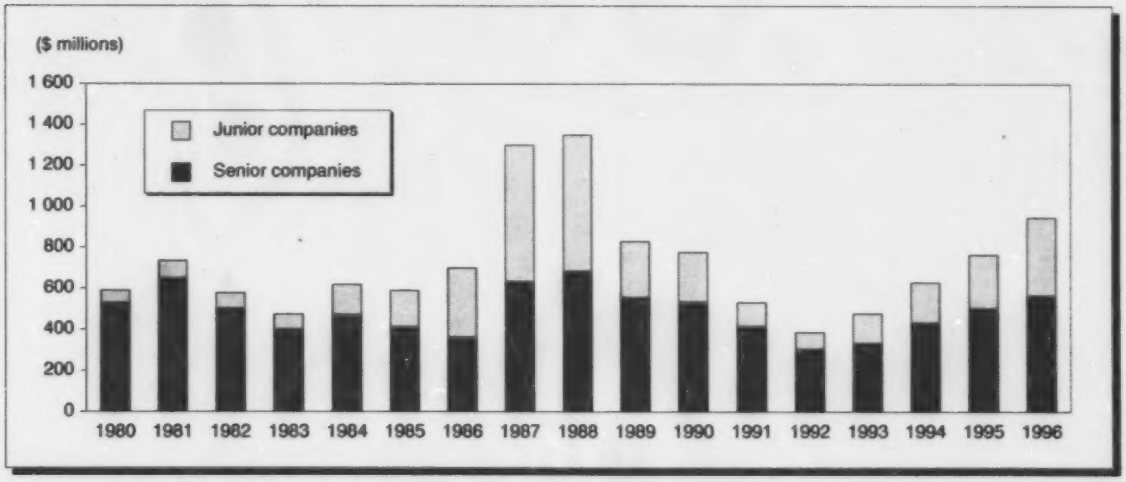
Source: Natural Resources Canada, from the federal-provincial survey of mining and exploration companies.
Notes: The years 1985 to 1994 are represented in each group. The left bar represents 1985; the right bar represents 1994. Overhead expenditures are not included.

Figure 22
Exploration Expenditures by Type of Company, 1989-96



Source: Natural Resources Canada, from the federal-provincial survey of mining and exploration companies.
Notes: The years 1985 to 1996 are represented in each group. The left bar represents 1989; the right bar represents 1996. 1995 data are preliminary estimates; 1996 data are company spending intentions. Overhead expenditures are included.

Figure 23
Exploration Expenditures by Junior and Senior Companies, 1980-96



Source: Natural Resources Canada, from the federal-provincial survey of mining and exploration companies.
Notes: Overhead expenditures are included. 1995 data are preliminary estimates; 1996 data are company spending intentions.

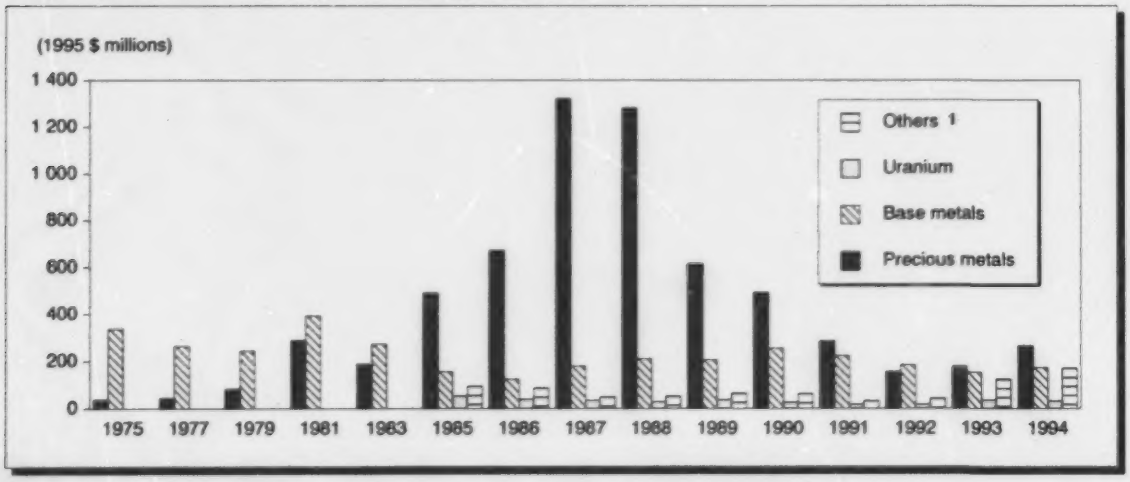
6.5 EXPLORATION EXPENDITURES BY TYPE OF COMMODITY SOUGHT

Exploration for precious metals (95% of which was for gold) peaked in 1987 (**Figure 24**) and subsequently declined as the availability of flow-through share capital decreased and as the gold price declined after the end of 1987. Expenditures for precious metals rose again during 1993 and 1994. The gold price was also up during those years.

Exploration expenditures for base metals were lowest in 1986. They increased each year until 1990 when they exceeded the lowest level of the late 1970s (**Figure 24**). Exploration for base metals declined again in 1991 through 1993. During 1992, the decrease in precious-metal exploration was much more severe (46%) than for base-metal exploration (17%). Consequently, total expenditures for base-metal exploration exceeded those for precious metals for the first time since 1983. By October 1993, the inflation-adjusted prices of nickel, copper, zinc and lead were at all-time lows, but they have recovered quite strongly since then.

In 1987 and 1988, exploration expenditures for all non-petroleum mineral commodities other than base and precious metals (**Figure 24**) accounted for only about 5% of total Canadian exploration expenditures. In 1989 and 1990, expenditures directed at other mineral commodities (excluding uranium) more than doubled in percentage terms, but did not actually increase significantly in constant dollars. In 1991, expenditures for "others" decreased, in both percentage and constant dollar terms, reaching their lowest levels since 1985. They increased again in 1992, both in percentage and in dollar terms, and they increased significantly in 1993 and 1994 (25% and 27% of the total expenditures respectively, or $124 million and $171 million each). Commodities such as diamonds, in particular, with some asbestos, potash, ferrous metals, graphite and tantalum, contributed to the increase in the level of expenditures in this "other" minerals and metals category.

Figure 24
Exploration Expenditures by Commodity Sought, 1975-94



Source: Natural Resources Canada, from the federal-provincial survey of mining and exploration companies.

[1] Includes ferrous metals, other metals, nonmetals (including coal and diamonds), and "not specified."

Notes: Overhead expenditures are included. Data were not compiled by commodity for 1976, 1978, 1980, 1982 and 1984. For 1975, 1977, 1979, 1981 and 1983, only a precious-metal/base-metal breakdown is available.

7. Canada's Standing as a World Exploration Target

7.1 INTRODUCTION

Because of the increased global competition for mining capital, there is considerable debate as to which country attracts the most mineral exploration investment. This section situates Canada among the world's top mineral investment destinations.

7.2 WORLD RANKING

In 1994, exploration expenditures in Canada totalled $628 million. Canada remained one of the world's top targets (second after Australia) for mineral exploration that year. In 1995, Canada, with planned exploration expenditures of $764 million (preliminary), again ranked second after Australia, thus continuing the close contest of the past three decades or more between these two countries.

Based on official Canadian and Australian government surveys of company exploration expenditures, Canada ranked first every year from 1981 through 1990, and probably also in 1991. Canada ranked second, after Australia, from 1992 through 1995 (**Figure 25**). For 1996, company exploration spending intentions for Canada total $945 million. No single country other than Australia will come close to challenging Canada for first position in 1996.

7.3 DISCREPANCIES BETWEEN EXPLORATION SURVEY RESULTS

There is considerable debate concerning Canada's relative share of worldwide non-petroleum mineral exploration activity. Discussion has centred around the results of the proprietary annual survey of worldwide mineral exploration budgets prepared by the Metals Economics Group (MEG) of Halifax, Nova Scotia. Data from this survey have generally ranked Canada lower than do the

Figure 25
Top Three Country Destinations of Mineral Exploration Capital from Worldwide Sources, 1970-95

Year	Rank		
	First	Second	Third
1995	Australia	**Canada**	United States
1994	Australia	**Canada**	United States
1993	Australia	**Canada**	United States
1992	Australia	**Canada**	United States
1991	**Canada**	Australia	United States
1990	**Canada**	Australia	United States
1989	**Canada**	Australia	United States
1988	**Canada**	Australia	United States
1987	**Canada**	Australia	United States
1986	**Canada**	Australia	United States
1985	**Canada**	Australia	United States
1984	**Canada**	Australia	United States
1983	**Canada**	Australia	United States
1982	**Canada**	Australia	United States
1981	**Canada**	Australia	United States
1980	Australia	**Canada**	United States
1979	Australia	United States	**Canada**
1978	Australia	United States	**Canada**
1977	United States	**Canada**	Australia
1976	**Canada**	United States	Australia
1975	United States	**Canada**	Australia
1974	**Canada**	United States	Australia
1973	Australia	United States	**Canada**
1972	United States	Australia	**Canada**
1971	United States	**Canada**	Australia
1970	**Canada**	United States	Australia

Source: Natural Resources Canada, based on official Canadian and Australian statistics and the best available data for the United States. Australian expenditures were 6.5% higher than those for Canada in 1983 and 3.3% higher in 1991; however, correcting the reported Australian totals for substantial mine development expenditures, which are not included in Canadian statistics, would rank Canada first in 1983 and 1991. No data are available for the former Soviet Union.

official Canadian exploration statistics. MEG results ranked Canada first in 1991, third in 1992, fourth in 1993, fifth in 1994 and third in 1995.

The MEG survey of exploration budgets for 1995 covers almost all countries. The survey is invaluable because it provides a unique source of information on the worldwide activities of the world's larger companies.

The exploration expenditure statistics available in the public domain for the United States for the years 1970 through 1979 are rough estimates and, as a result, the relative position of the United States among the top three contenders for global exploration investment (**Figure 25**) is uncertain for the years 1970-79. U.S. exploration statistics for the years 1980 through 1991 are from incomplete annual surveys carried out by the American Bureau of Metal Statistics Inc. for the Society of Economic Geologists. However, the latter survey no longer yields useful exploration data; therefore, since 1992, the MEG survey is the only source of aggregate exploration statistics for the United States.

Statistics provided by Canada's federal-provincial survey of mining and exploration companies are a much more complete source of information for ranking Canadian exploration activity, as are similar statistics published by the Australian Bureau of Statistics for ranking Australian activity. However, even the official Canadian and Australian exploration expenditure statistics are not completely comparable because Australian exploration statistics include some costs that Canadian statistics exclude.

It is clear that, relative to Canadian exploration statistics, annual Australian exploration expenditures are overstated. Canadian exploration statistics exclude the search for extensions to orebodies at producing mines, but the statistics prepared by Australia take such activity into account, including the cost of any necessary underground workings. This difference probably increases Australian exploration statistics by several tens of millions of dollars annually, or perhaps even more. In addition, Canadian exploration statistics clearly exclude the cost of prefeasibility and feasibility studies, as well as the cost of technical and engineering studies. Although such costs are not meant to be included in Australian totals, the instructions provided on the Australian survey questionnaire do not make this prohibition absolutely clear.

MEG results understate Canada's share of worldwide exploration activity. There are several reasons for this. First, MEG results account for only 50-55% of total Canadian exploration expenditures because this survey covers only some 49 companies exploring in Canada and some 150 companies worldwide, substantially fewer than the 700 or more companies currently engaged as project operators in mineral exploration in Canada.

Secondly, MEG has used ever-increasing exploration budget cut-offs to limit the universe of companies that it has surveyed in successive years. For 1995, companies surveyed were restricted to those having total worldwide exploration budgets of at least US$3 million, equivalent to C$4 million, which is a rather high cut-off. For 1994, the cut-off was US$2 million and, in prior years, the cut-off had been US$1 million.

The MEG survey cut-off of US$3 million for 1995 substantially underestimates exploration activity in both Canada and Australia. It will likely be even more understated in 1996 because there are indications that MEG's cut-off for 1996 has been increased to US$4 million (C$5.5 million). This is because the contribution made by junior exploration companies is so much greater in Canada and Australia than it is in other countries. Both Canada and Australia have hundreds of producing or non-producing (junior) companies that individually spend less than US$3 million annually on exploration but that, as a group, account for a substantial amount of exploration activity.

In 1995, MEG reported two aggregate exploration budgets for Canada: US$293.2 million on the basis of 49 company returns, and US$328 million on the basis of an allocation to Canada of 12.2% (US$2.69 billion) of total world exploration budgets. The US$328 million is based on a pro-rated portion of the budgets of companies that did not, in their responses, allocate their worldwide exploration budgets by country.

However, a thorough comparison of the companies surveyed by MEG for 1995 with individual company spending intentions for Canada from the 1995 federal-provincial survey of mining and exploration companies shows that some 650 companies that had exploration expenditures in Canada were not included in the MEG survey. According to Canadian federal-provincial statistics, these companies had planned, in aggregate, to spend US$171.5 million exploring for those mineral commodities surveyed by MEG. The resulting underestimation of total exploration activity is most likely greater in the case of Canada than in the case of Australia.

Thirdly, the MEG survey does not cover exploration for all of the mineral commodities sought by companies. For example, uranium is not covered, but companies intended to spend C$40 million (US$29 million) on uranium exploration in Canada during 1995, more than half of the total world uranium exploration budgets compiled by the International Atomic Energy Agency. Although Australia, Canada and the United States are the front-runners in terms of total world mineral exploration, no uranium exploration expenditures were expected to be made in Australia in 1995, while those in the United States were expected to be less than C$4 million (US$2.9 million). As a consequence of the limited commodity coverage, Canadian exploration budgets reported by MEG tend to underestimate Canadian exploration activity relative to that in other countries, and especially in the other two most important exploration countries.

Fourthly, some MEG rankings compare total exploration budgets in individual countries such as Australia, Canada and the United States with those in vast geographical regions such as Latin America, Africa, Pacific and "Rest of World." Some of these comparisons are arbitrary. Latin America consists of more than 20 separate countries that jointly have an area, on two continents, that is more than double that of each of Canada, the United States and Australia. Latin America, in aggregate, also has a mineral industry with an annual value of non-petroleum mineral production that is almost double that of Canada and, therefore, it would not be unexpected for total Latin American exploration expenditures to be double those of Canada.

Until 1995, MEG's "Rest of World" had an area about 10 times that of Canada, 10 times that of the United States and about 12 times that of Australia. However, in 1995, MEG, in a further change of methodology, separated Africa from "Rest of World" and, as a result, the area of "Rest of World" decreased by 30%. This change helped to shift Canada's position in terms of exploration activity (according to MEG) from fifth in 1994 to third in 1995. However, if Canada, the United States and the Central American portion of Latin America had, for example, been combined into a region called North America, then North America would be first in terms of worldwide exploration activity.

7.4 CHANGING EXPLORATION EXPENDITURES – CANADA VERSUS THE WORLD

Exploration expenditures have been increasing annually since 1992, both in Canada and in the world as a whole. **Table 14** compares percentage increases in exploration expenditures or budgets in Canada (from the federal-provincial survey of mining and exploration companies) and in the remainder of the world (from MEG) since 1992. Although the percentage comparisons are not exact because of the changing annual budget cut-offs used in successive MEG surveys and because MEG does not include exploration budgets for all commodities, Canada has, since 1992, most likely increased its share of world mineral exploration expenditures.

TABLE 14. RATE OF GROWTH OF EXPLORATION EXPENDITURES, CANADA COMPARED TO THE WORLD, 1991-96

Year	Exploration Expenditures in Canada[1]		Exploration Budgets in the Remainder of the World[2]	
	Growth Compared to Low Year 1992		Growth Compared to Low Year 1992	
	(C$ millions)	(%)	(US$ millions)	(%)
1991	531.8	n.a.	1 846	n.a.
1992	385.3	n.a.	1 610	n.a.
1993	477.3	+24	1 900	+18
1994	628.1	+63	2 130	+32
1995	763.5[a]	+98	2 690	+67
1996	945.2[b]	+145	. .	. .

Source: Natural Resources Canada.
. . Not available; n.a. Not applicable.
[a] Based on preliminary exploration survey. [b] Based on company spending intentions.
[1] Federal-provincial survey of mining and exploration companies. [2] Metals Economics Group survey.

8. Globalization of the Mining Industry

8.1 THE GLOBAL MARKET FOR EXPLORATION

The global market for exploration for precious metals, base metals and diamonds grew by 20% to US$3.5 billion (C$4.9 billion) during 1995, up from US$2.9 billion (C$4.0 billion) in 1994.[2] Much of the growth is occurring in developing countries.

8.1.1 Larger-Company Market

Much of what is known about global trends in mineral exploration for precious metals, base metals and diamonds is derived from the population of larger companies worldwide.[3] The larger companies, defined here as those with annual exploration budgets greater than US$3 million (C$4 million), control about three-quarters of the global exploration market. These larger companies alone were expected to spend US$2.69 billion (C$3.74 billion) on exploration worldwide during 1995.

8.2 CANADIAN MINING ACTIVITY ABROAD

8.2.1 Property Portfolio

At the end of 1995, companies of all sizes listed on Canadian stock exchanges had a worldwide portfolio of more than 7300 exploration and production properties (**Figure 26**).[4] Some 2750 of these properties, or about one-third of the total Canadian portfolio, are located in 99 countries around the world.

Between 1992 and 1995, the annual compound rate of growth in the acquisition of foreign properties by companies of all sizes listed on Canadian stock exchanges was over 15%. Although the annual rate of growth of acquisitions slowed down to 10% from 1994 to 1995, it nonetheless resulted in an increase of 300 Canadian properties abroad during 1995.

Properties held by Canadian companies abroad have increased from about 20% of the total Canadian portfolio of properties in 1992 to almost 40% in 1995.

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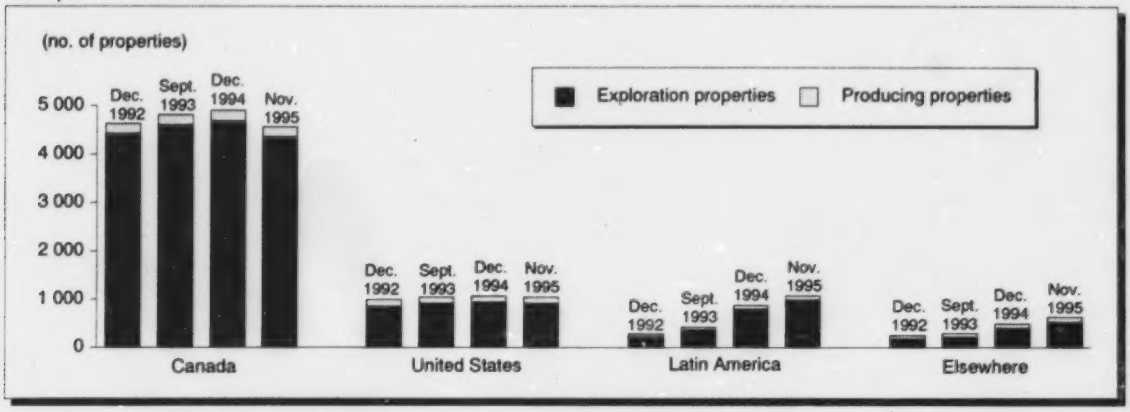
[2] *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia, September 1995, p. 12.

[3] Most of the information on the budgets of larger exploration companies is based on the September 1992, September 1993, September 1994 or September 1995 edition of *Corporate Exploration Strategies: A Worldwide Analysis*, published by the Metals Economics Group, Halifax, Nova Scotia.

[4] The quantitative information on the worldwide mineral properties of companies listed on Canadian stock exchanges is derived from the MIN-MET CANADA database produced by ROBERTSON INFO-DATA Inc., Vancouver, British Columbia.

Figure 26
Worldwide Mineral Property Portfolio of Companies Listed on Canadian Stock Exchanges, by Region, 1992-95
Companies of All Sizes



Source: Natural Resources Canada, based on *MIN-MET CANADA* database, ROBERTSON INFO-DATA Inc., Vancouver, British Columbia, and used under licence.

Most of the worldwide properties in which companies of all sizes listed on Canadian stock exchanges have an interest are at the exploration stage. The ratio of foreign exploration properties to the total number of foreign exploration and producing properties held by such companies has increased steadily since 1992. In late 1992, that ratio was 0.82 for Latin America and 0.74 for the rest of the world. However, by late 1995, it had increased to 0.92 and 0.83, respectively. In comparison, the ratio of exploration properties to the total number of properties in Canada has remained constant at about 0.95 during the past four years. Therefore, it would appear that Canadian companies have assumed, over a relatively short period of time, increasing amounts of geological and country exposure abroad.

The Americas have remained the focus abroad of companies of all sizes listed on Canadian stock exchanges. On a regional basis, the United States and the large area that comprises Latin America and the Caribbean each account for about 40% of all Canadian mining properties abroad. On a country basis, two dozen nations, spread across the globe, account for 80% of the more than 1700 Canadian mining properties abroad that are located outside of the United States.

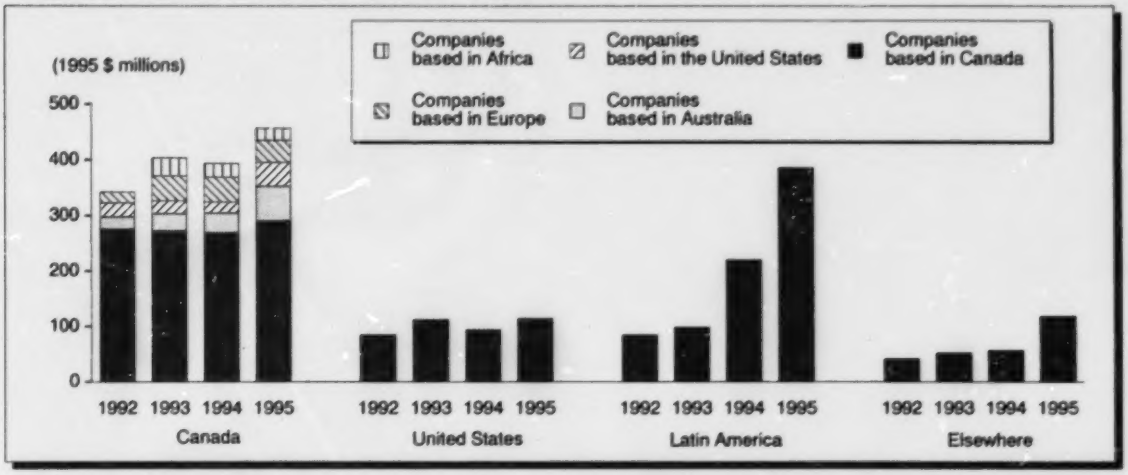
8.2.2 Exploration Budgets of the Larger Companies

In 1995, 55 larger Canadian-based companies with individual annual exploration budgets of more than $4 million were expected to spend over $900 million on mineral exploration in Canada and throughout the world (**Figure 27**). More than $600 million of the aggregate budgets of these companies was expected to be spent outside of Canada. Canadian-based companies control almost 25% of the worldwide larger company market for mineral exploration.

Over the past four years, the budgets (adjusted for inflation) of the larger Canadian-based companies for exploration abroad have increased at an annual compound rate of over 25% from $210 million in 1992.

The proportion of aggregate exploration budgets of the larger Canadian-based companies expected to be spent outside of Canada rose to 70% in 1995. In 1992, 1993 and 1994, the proportions were 40%, 50% and 60%, respectively.

Figure 27
Aggregate Exploration Budgets of the World's Larger Companies for Canada, and of the Larger Canadian-Based Companies Abroad, 1992-95
Companies with Worldwide Budgets of At Least $4 million (US$3 million)
For Precious-Metal, Base-Metal or Diamond Exploration



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.
Notes: Worldwide exploration budgets of companies that intended to spend less than $4 million (US$3 million) annually, of which there are several hundred based in Canada, are not included. Worldwide exploration budgets for other commodities such as uranium or industrial minerals are also not included.

8.2.3 Activity in the United States

In 1995, the larger-company exploration market in the United States was valued at some $408 million, or 11% of the $3.74 billion larger-company market worldwide.

Aggregate Canadian exploration activity in the United States has remained fairly steady during the past four years. There has been no growth in the number of properties held in the United States by companies of all sizes listed on Canadian stock exchanges during this period, and the number of properties has remained at about 1000 per year.

However, the larger Canadian-based companies planned to spend $114 million on exploration in the United States during 1995. Adjusted for inflation, the annual exploration expenditures planned for the United States by the larger Canadian-based companies grew at an annual compound rate of about 4% between 1992 and 1995. Canadian-based companies held 28% of the larger-company market for exploration in the United States in 1995. Corrected for inflation, the corresponding market share in 1992 was only 20%.

8.2.4 Activity in Latin America and the Caribbean

In 1995, the larger-company exploration market in Latin America was valued at some $1090 million, or 29% of the $3.74 billion larger-company market worldwide.

Much of the growth in Canadian mineral exploration activity abroad in the last four years has occurred in Latin America. The larger Canadian-based companies were expected to spend $385 million on exploration in Latin America and the Caribbean, a substantial increase over the $220 million that they had budgeted for 1994. Adjusted for inflation, Canadian exploration budgets for Latin America grew at an annual compound rate of over 40% between 1992 and 1995. In 1995, Canadian-based companies controlled 35% of the larger-company market in Latin America, the largest share in the region. In 1992 (adjusted for inflation), their share of the market was 27%.

At the end of 1995, there were at least 200 Canadian mining companies active in South America, 100 in Mexico and 75 in Central America and the Caribbean. During 1995, the number of properties held in Latin America by companies of all sizes listed on Canadian stock exchanges surpassed the number held in the United States. Companies of all sizes listed on Canadian stock exchanges held 700 properties in South America, 240 in Mexico, and 110 in Central America and the Caribbean. They held more than 100 in each of Venezuela and Chile, and more than 50 in each of Argentina, Bolivia, Brazil, Ecuador, Guyana and Peru.

Two-thirds of Canadian mining companies active in Mexico in December 1994 were listed on junior stock exchanges in Canada, predominantly the Vancouver Stock Exchange. During 1994, there was a significant increase in the average size of mineral property portfolios held by Canadian companies in Mexico. Already, at the end of 1994, companies of all sizes listed on Canadian stock exchanges had projects in at least half of Mexico's 32 states.[5] A number of these projects have now come to fruition, among which is Calgary-based Fording Coal Limited's Pilares project in the state of Sonora. In January 1996, Fording Coal announced that it had finalized plans to build the world's largest wollastonite ($CaSiO_3$) mine at Pilares.

8.2.5 Activity in Africa

In 1995, the larger-company exploration market in Africa was valued at some $445 million, or 12% of the $3.74 billion larger-company market worldwide.

The larger Canadian-based companies planned to spend over $49 million on exploration in Africa during 1995, equivalent to about 11% of the larger-company market on that continent.

Canadian mining activity in Africa increased substantially during the last two years so that, by the end of 1995, 140 companies of all sizes listed on Canadian stock exchanges had interests in about 325 mining properties located in 26 African countries. These companies had 60 properties or more in each of Ghana and Tanzania, and 20 or more in each of Botswana, Burkina Faso, South Africa and Zimbabwe. The number of properties that they acquired in Africa grew at an annual compound rate of over 60% from late 1992 to late 1995.

In Ghana, Sierra Leone, Tanzania and Zimbabwe, Canadians are involved mainly in gold and diamond projects. In Botswana, the Central African Republic, Namibia, South Africa and Zaïre, they are focussing mainly on diamonds. In Burkina Faso, Ethiopia, Gabon, Ivory Coast, Kenya, Mali, Mozambique, Niger, Swaziland and Uganda, their projects are mainly for gold.

Canadians also have interests in several base-metal projects in Africa, notably in Burkina Faso, Eritrea, Ivory Coast, the Sudan, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe.

In addition, there is a considerable variety of other mineral commodities of interest to Canadian companies in Africa. Some of these commodities are not produced or widely explored for in Canada. Canadians are looking for gemstones such as amethyst, emerald, ruby or sapphire in Guinea, Tanzania and Zambia. They are looking for platinum group metals in South Africa, and for heavy minerals such as hematite, ilmenite, magnetite, monazite, rutile or zircon in Namibia and Tanzania. They also have manganese projects in Burkina Faso and Namibia, and bauxite interests in Ghana and Guinea.

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[5] More detailed information on penetration of the Mexican mineral exploration market by Canadian mining companies, including tables of companies and their projects, can be found in André Lemieux, *Canadian Mining Activity in Mexico*, World Mineral Notes, Vol. 11, No. 1, March 1995, Mining Sector, Natural Resources Canada, Ottawa, pp. 23-34.

8.2.6 Activity in Southeast Asia

About 40 companies of all sizes listed on Canadian stock exchanges were active in seven countries of Southeast Asia at the end of 1995. These companies had interests in almost 70 properties in that region. Canadians are most active in the Philippines where they have over 35 projects, and in Indonesia where they have more than 15. Most of the Canadian projects in the Philippines involve gold or copper-gold, but there are a significant number of chromite and nickel projects as well.

Until recently, the best-known Canadian project in Indonesia was P.T. Inco's Soroako open-pit lateritic nickel mine, which has been in production since 1978. However, attention has shifted recently to Calgary-based Bre-X Minerals Ltd. and its Busang gold deposit in Kalimantan on the eastern portion of the island of Borneo.

Although the majority of Canadian mining projects in Indonesia involve gold, Canadians have a variety of other projects there, including some dealing with heavy minerals (cassiterite and chromite), zeolites, copper-sulphuric acid, lead-zinc-silver and copper-gold.

In Thailand, Canadian projects involve gold, zinc-lead-silver, tungsten-tin and potash. Canadians have recently initiated projects in Vietnam and Myanmar (Burma). Canadians are focussing almost exclusively on gold in Vietnam and Myanmar, as well as in Laos and Malaysia.

8.2.7 Activity in Australia

In 1995, the larger-company market for exploration in Australia was valued at $734 million, or 20% of the larger-company market worldwide.

Larger Canadian-based companies hold a relatively small share of the larger-company market for exploration in Australia. Placer Pacific alone, which is Australian based but more than 75% controlled by Canadian-based Placer Dome Inc., intended to spend some $9.2 million in Australia during 1995.

Companies of all sizes listed on Canadian stock exchanges had about 50 properties in Australia in 1995. The number of properties held in Australia by such companies has decreased yearly from about 60 in 1992.

8.3 THE CANADIAN MARKET SEGMENT

With the exception of Canada and Australia, comprehensive exploration information is not available for the whole world. As a result, comprehensive comparisons of worldwide exploration activity are only practical for the population of larger companies.[6]

In 1995, the larger-company market for exploration in Canada was valued at $456 million, or 12% of the larger-company market worldwide. However, this is only a portion of the total Canadian market for mineral exploration.[7]

The larger Canadian-based companies were expected to spend over $291 million in Canada during 1995, up from $269 million in 1994, the first increase since 1992 for such companies (**Figure 28**).

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[6] Some of the major strengths and limitations of the Canadian, Australian and Metals Economics Group surveys are discussed in Section 7.

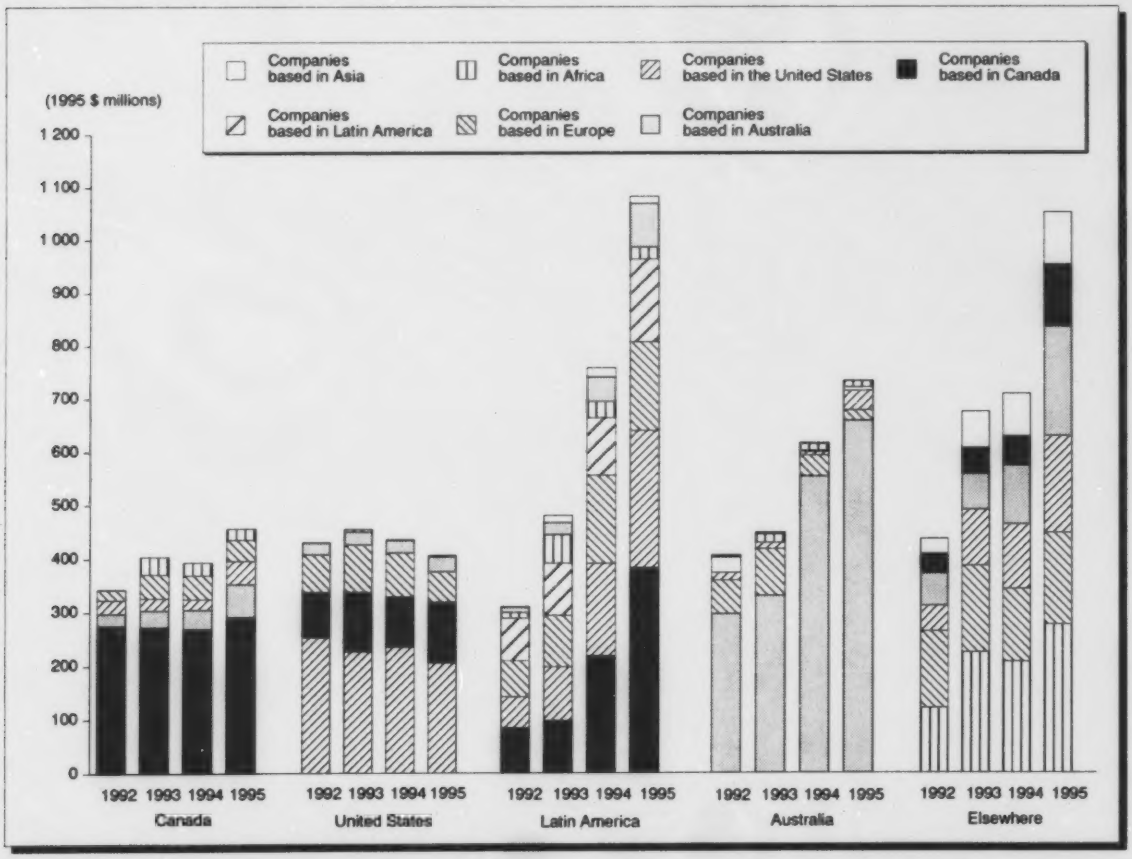
[7] Canadian exploration statistics are discussed in detail in Section 1.

In 1995, Canadian-based companies controlled 64% of the larger-company market for mineral exploration in Canada, the dominant share in Canada. The situation is identical in the United States and Australia where American- and Australian-based companies control the biggest share of their respective national larger- company markets for mineral exploration. However, in 1992, Canadian-based companies had controlled 80% of the larger-company exploration market in Canada. With increasing globalization, the market share controlled by larger domestic firms has also declined in the United States and in Latin America. In Australia, on the other hand, Australian companies have increased their share of the larger-company market from 73% in 1992 to 90% in 1995.

Globalization of the industry is not only occurring in developing countries. Over the last four years, much of the increase in exploration expenditures of the larger companies in Canada has resulted from foreign investment by Australian-based and, to a lesser extent, American-based and European-based companies. As a result, the total exploration budgets of the larger companies have increased most years in Canada since 1992 (**Figure 28**).

Foreign-based larger companies were expected to spend $165 million in Canada during 1995, 36% of the $456 million budgeted in total for this country by all of the larger companies from around the world, including Canadian-based companies.

Figure 28
Aggregate Exploration Budgets of the World's Larger Companies, by Region, 1992-95
Companies with Worldwide Budgets of at Least $4 million (US$3 million)
For Precious-Metal, Base-Metal or Diamond Exploration



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.
Notes: Worldwide exploration budgets of companies that intended to spend less than $4 million (US$3 million) annually, of which there are several hundred based in Canada or Australia, are not included. Worldwide exploration budgets for other commodities such as uranium or industrial minerals are also not included.

However, several foreign-based multinational mining companies, many of which are based in Australia, the United States, South Africa or Japan, conduct little or no apparent significant mineral exploration activity in Canada. For example, the state-owned Metal Mining Agency of Japan (MMAJ) had a $74.3 million budget for exploration worldwide during 1995. Some $12.9 million was destined for Latin America, $6.5 million for Africa and $1.9 million for the United States; none of that company's budget was earmarked for Canada.

8.4 SUMMARY AND CONCLUSIONS

Governments throughout the world are improving the climate for mineral investment in their respective jurisdictions. The effectiveness of such policies is most noticeable in the developing countries and there is every indication that, for the foreseeable future, the process of increasing the efficiency of mineral resource development will continue, if not accelerate, worldwide.

The mining industry is becoming evermore globalized, and growth in mining activity is expected to continue in many countries of Latin America, Africa, Southeast Asia and the former Soviet Union. In many countries in these regions, there is enormous geological potential, but modern exploration techniques have yet to be widely used. The specific loci of future growth in mineral exploration and development will be influenced significantly by industry perceptions of country risks and rewards.

Because of their knowledge and expertise, Canadian companies are well positioned to respond to opportunities arising from the globalization of the mining industry. Canadian-based companies now control one-quarter of the world's larger-company market for precious-metal, base-metal and diamond exploration, and they hold the dominant share of that market in both Canada and Latin America. They have diversified their mineral project portfolios into 100 countries.

While they continue to penetrate foreign mineral exploration and development markets, Canadian companies are also providing considerable opportunity for Canadian suppliers of goods and services to expand sales abroad. Through their presence abroad, Canadian companies are helping many countries to develop their mineral resources and, as a result, a more open economy. For the foreseeable future, Canadian companies will continue to be a driving force for exploration and mining abroad, and further penetration of foreign markets by Canadians can be expected.

Globalization is not only taking place in developing countries. Many foreign mining companies are continuing to diversify their mineral property portfolios into developed countries, including Canada. During the last four years, Canada has attracted increasing amounts of exploration investment from some of the larger foreign-based companies, which has helped to increase the total amount of exploration activity in Canada.

APPENDIX A:

Federal-Provincial Survey of Mining and Exploration Companies

Federal-Provincial Survey of Mining and Exploration Companies

SURVEY PROCESS

The federal-provincial survey of mining and exploration companies is conducted twice a year. It provided information in early 1996 about preliminary results for 1995 total exploration activity and 1996 spending intentions. In early 1996, a more detailed survey (actual) on 1995 exploration activity was distributed and is currently being compiled. The preliminary survey was conducted during the last quarter of 1995 and January 1996, while the actual survey will be conducted throughout 1996.

The detailed survey provides other project-based information, including specific commodities explored for, the type of field work undertaken, related overhead expenditures, type of company involved, joint-venture partners, and other details. Commodity-specific information on exploration for diamonds for 1995 and 1996 was estimated by NRCan. These estimates are based on knowledge of the industry and on previously reported information that has been confirmed with the company involved or with the provincial/territorial counterpart.

The surveys are a full census of companies involved in mineral exploration in Canada. Generally, only about 2% of questionnaires are not completed. When this happens, estimates to replace missing values are provided by the province or territory concerned. However, this 2% usually represents small or inactive operations.

Surveys are conducted through a joint effort between the federal government and participating provinces. Statistics Canada coordinates the survey sent to mineral-producing establishments (241 questionnaires in October 1995); NRCan coordinates the survey for those firms that have properties not yet committed to production (1932 questionnaires, also in October 1995). Altogether, 1414 companies and prospectors were surveyed. It should be noted that a company may receive more than one questionnaire depending on the number of provinces in which it has activities. **To avoid duplicate reporting, joint-venture partners who are not project operators do not report intended expenditures on exploration**. Companies were asked to report exploration expenditures for their fiscal year that ends between April 1 and March 31 of the following year for each year surveyed.

SURVEY DETAILS

The time lag between the 1996 forecast survey conducted in late 1995 and the final 1996 survey to be conducted in 1997 may give rise to discrepancies between the two surveys.

Intentions may often be modified by events that can limit the availability of funds, such as stock market conditions, changing metal prices, general economic factors or company-specific factors, and the impact of new discoveries. As shown in **Table 15**, the results of this survey cannot be interpreted as being an accurate reflection of the exploration that will ultimately be performed in 1996.

Table 15 shows intentions, as well as preliminary and actual expenditures, when available, for mine-site and general exploration for the years 1985-96. This table demonstrates that, for the

TABLE 15. CANADA, COMPARISON OF INTENTIONS, PRELIMINARY AND ACTUAL EXPLORATION EXPENDITURES, 1985-96

Exploration Expenditures	Intentions	Preliminary	Actual	Actual/Intentions
		($ millions)		(%)
1985				
Mine-site	150.9	89.4	100.1	
General	361.2	471.5	488.8	
Total	512.1	560.9	588.9	+15
1986				
Mine-site	87.5	110.2	108.6	
General	431.2	483.6	589.3	
Total	518.7	593.8	697.9	+35
1987				
Mine-site	122.6	121.5	161.0	
General	583.2	849.6	1 139.0	
Total	705.8	971.1	1 300.0	+84
1988				
Mine-site	154.7	138.7	143.0	
General	891.0	1 107.9	1 207.0	
Total	1 045.7	1 246.6	1 350.0	+29
1989				
Mine-site	111.7	160.0	115.3	
General	832.2	766.7	712.5	
Total	943.9	926.7	827.8	-12
1990				
Mine-site	150.0	107.7	112.4	
General	633.0	643.5	662.3	
Total	783.0	751.2	774.7	-1
1991				
Mine-site	97.9	80.4	67.3	
General	548.3	514.4	464.4	
Total	646.2	594.8	531.7	-18
1992				
Mine-site	71.2	75.4	59.4	
General	426.3	344.2	325.9	
Total	497.5	419.6	385.3	-23
1993				
Mine-site	70.1	78.1	64.0	
General	364.5	404.9	413.2	
Total	434.6	483.0	477.2	+10
1994				
Mine-site	66.0	68.3	72.3	
General	470.9	561.8	555.8	
Total	536.9	630.1	628.1	+17
1995				
Mine-site	67.9	76.9		
General	586.8	686.6		
Total	654.7	763.5	. .	. .
1996				
Mine-site	79.4			
General	865.8			
Total	945.2	. .	. .	. .

Source: Federal-provincial survey of mining and exploration companies.
. . Not available.

periods 1985-88 and 1993-95, total expenditures reported, initially on a preliminary basis and then later on an actual basis, generally exceeded intentions for the same period. For the period 1989-92, this pattern was reversed. The explanation for the period 1985-88 could be that flow-through share exploration funding became more available than companies had originally anticipated but, starting in 1989, there was an unexpected decline in the availability of those flow-through share funds. Similarly, for the period 1993-95, general funding was probably more accessible than originally expected as a result of the growing interest generated by diamond discoveries and Voisey's Bay.

DEFINITIONS

The questionnaires requested information on both general (off-property) and mine-site (on-property) exploration expenditures. Those numbers are combined for most of the analysis. General exploration includes exploration activity on properties neither in production nor committed to production, while mine-site exploration measures activity on additional deposits on properties either in production or committed to production. Field work and total expenditures, including overhead costs, are both available from the actual survey. The preliminary survey includes only total exploration with overhead costs. Overhead costs include land costs, field administration costs, and exploration-related head office expenses.

CLASSIFICATION OF COMPANIES

Some of the analysis within this report is carried out according to the six company types defined later in this appendix. Other sections only distinguish between junior and senior companies. The senior category includes categories 1-4 and 6. As stated above, for joint ventures, total project expenditures are reported by the project operator. As discussed in section 6.4, junior participation can be found in projects managed by senior companies and, to a lesser extent, seniors can be found in projects managed by junior companies. Nevertheless, data analysis has been consistent over the years and a clear trend can be noted.

Companies exploring in Canada are classified into six groups, as follows:

1) Producers: Companies with a producing mine or part ownership in a producing mine in Canada, and companies that own more than 50% of the shares of a producing mining company. Also includes oil companies or foreign companies with a producing Canadian mine.

2) Affiliates of producing mining companies: Wholly owned or majority-owned incorporated subsidiaries of producers.

3) Oil companies: Oil companies, both domestic and foreign, with non-petroleum exploration projects in Canada. Oil companies with producing mines are included with producers.

4) Foreign companies: This group excludes foreign-owned oil companies and foreign-owned companies with a producing mine in Canada.

5) Junior companies and prospectors: This group excludes all of the other categories.

6) Other companies: Canadian-owned companies engaged in mineral exploration, including forestry, construction and consulting firms, and government-owned mining companies that do not own a producing mine. This category also includes Canadian-owned companies with operating mines only in countries other than Canada.

A company is classified into the first of these groups into which it fits. For example, exploration statistics reported by an oil or foreign company with a producing Canadian mine would be included in Category 1 (producers), rather than in Category 3 (oil companies) or Category 4 (foreign companies). Exploration by foreign-owned oil companies would appear in Category 3 (oil companies), and not in Category 4 (foreign companies).

APPENDIX B:

A Listing of the Two Main Exploration Properties or Groups of Properties by Province or Territory in 1995 and 1996

TABLE 16. TWO MAIN EXPLORATION PROPERTIES OR GROUPS OF PROPERTIES BY PROVINCE OR TERRITORY, 1995

Province/Territory	Company	Main Project	Commodity
Northwest Territories	BHP Minerals Canada Ltd.	Lac de Gras claims (pipes: Panda, Misery, Koala, Fox, Pigeon and Leslie)	Diamond
	Lytton Minerals Ltd.	Snowpipe property in Northern Slave Province	Diamond
Newfoundland	Archean Resources Ltd.	Voisey's Bay project	Nickel, copper, cobalt
	Noranda Mining and Exploration Ltd.	Buchans area	Base metals
Ontario	Placer Dome Canada Ltd.	Musselwhite property and northeastern and northwestern Ontario properties	Gold
	Falconbridge Limited	Sudbury Basin mines and other properties in Kidd and Wark Townships	Copper, zinc, nickel
Saskatchewan	Cameco Corporation	McArthur River project	Uranium
	Cogema Resources Inc.	McClean Lake project	Uranium
Québec	Agnico-Eagle Mines Ltd.	Vezza project and Goldex Extension project	Precious metals
	SOQUEM	Chibougamau and Eastmain areas	Copper, zinc, silver, gold
Yukon	United Keno Hill Mines Ltd.	Keno Hill project	Silver
	Westmin Resources Ltd.	Wolverine deposit	Gold, copper, zinc, lead, silver
British Columbia	American Bullion Minerals	Red Chris project near Iskut	Copper, gold
	North American Metals	Grizzly and Kodiac deposits near Golden Bear mine	Gold
New Brunswick	Noranda Mining and Exploration	Half Mile Lake property	Zinc, lead, copper, silver
	Brunswick Mining & Smelting Corp.	Bathurst Camp area	Base metals, precious metals
Alberta	Cardinal River Coal Ltd.	Cheviot mine project	Coal
	Smoky River Coal Ltd.	Smoky River coal mine	Coal
Nova Scotia	Placer Dome Canada Ltd.	Goldboro property	Gold
	Ecum Secum Enterprises Ltd.	Central Nova Scotia	Base metals, precious metals
Manitoba	Hudson Bay Exploration & Development Ltd.	Properties include: Namew Lake, Snow Lake, Flin Flon (Sherridon), Leaf Rapids (Lynn Lake)	Base metals
	Inco Limited	Pipe Deep South project, south of Thompson	Nickel
	Forecast Exploration ($ millions)		**% of Total Canadian Expenditures**
Total for these projects	252.9		32.2
Total for these companies	277.4		36.2

Source: Federal-provincial survey of mining and exploration companies.

TABLE 17. TWO MAIN EXPLORATION PROPERTIES OR GROUPS OF PROPERTIES BY PROVINCE OR TERRITORY, 1996

Province/Territory	Company	Main Project	Commodity
Northwest Territories	BHP Minerals Canada Ltd.	Lac de Gras claims (pipes: Panda, Misery, Koala, Fox, Pigeon and Leslie)	Diamond
	Kennecott Canada	Diavik property	Diamond
Newfoundland	Archean Resources Ltd.	Voisey's Bay project	Nickel, copper, cobalt
	Roycefield Resources Ltd.	Beaverbrook deposit	Antimony
Saskatchewan	Cameco Corporation	McArthur River project	Uranium
	Cogema Resources Inc.	McClean Lake project	Uranium
Québec	Ressources Orléans Ltée	St. Onge wollastonite property	Wollastonite
	Agnico-Eagle Mines Ltd.	Vezza project and Goldex extension project	Gold
Ontario	Falconbridge Limited	Sudbury Basin mines and other properties in Kidd and Wark Townships	Copper, zinc, nickel
	Outokumpu Mines Ltd.	Montcalm property	Nickel, copper
British Columbia	Taseko Mines Limited	Prosperity deposit	Gold, copper
	Royal Oak Mines	Kemess South project	Copper, gold
Yukon	Westmin Resources Ltd.	Wolverine deposit	Gold, copper, zinc, lead, silver
	United Keno Hill Mines	Keno Hill project	Silver
New Brunswick	Noranda Mining and Exploration	Half Mile Lake property	Zinc, lead, copper, silver
	Brunswick Mining & Smelting Corp.	Bathurst Camp area	Base metals, precious metals
Nova Scotia	Regal Resources Ltd.	Cheticamp property in Cape Breton	Gold, nickel
	Burnt Point Resources Ltd.	Peak and Burnt Point	Base metals
Alberta	Cardinal River Coal Ltd.	Cheviot mine project	Coal
	Smoky River Coal Ltd.	Smoky River coal mine	Coal
Manitoba	Hudson Bay Exploration & Development Ltd.	Properties include: Namew Lake, Snow Lake, Flin Flon (Sherridon), Leaf Rapids (Lynn Lake)	Base metals
	Inco Limited	Pipe Deep South project, south of Thompson	Nickel
	Forecast Exploration ($ millions)		**% of Total Canadian Expenditures**
Total for these projects	316.5		33.2
Total for these companies	332.5		35.0

Source: Federal-provincial survey of mining and exploration companies.

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